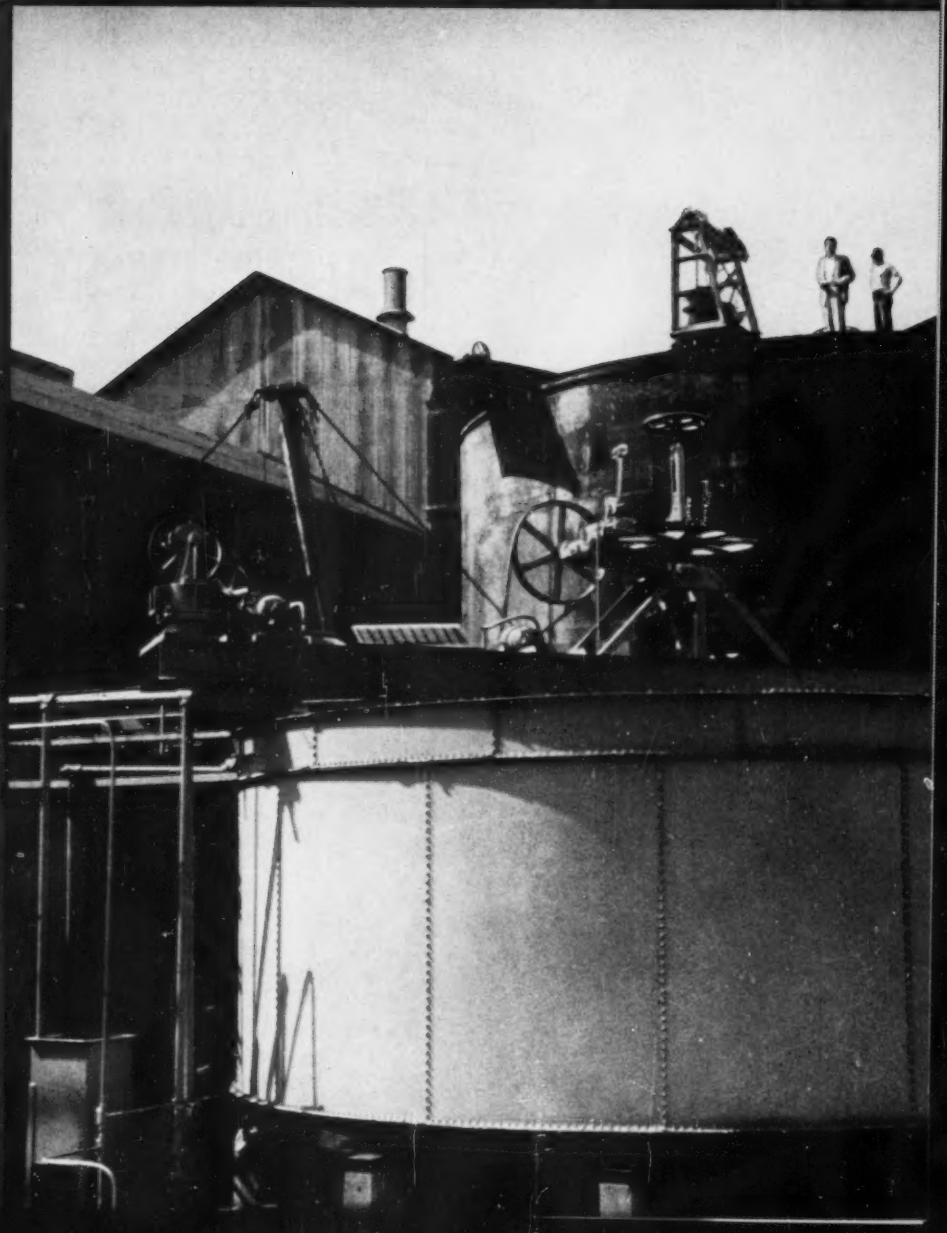
The Institute Spokesman

APRIL • 1958



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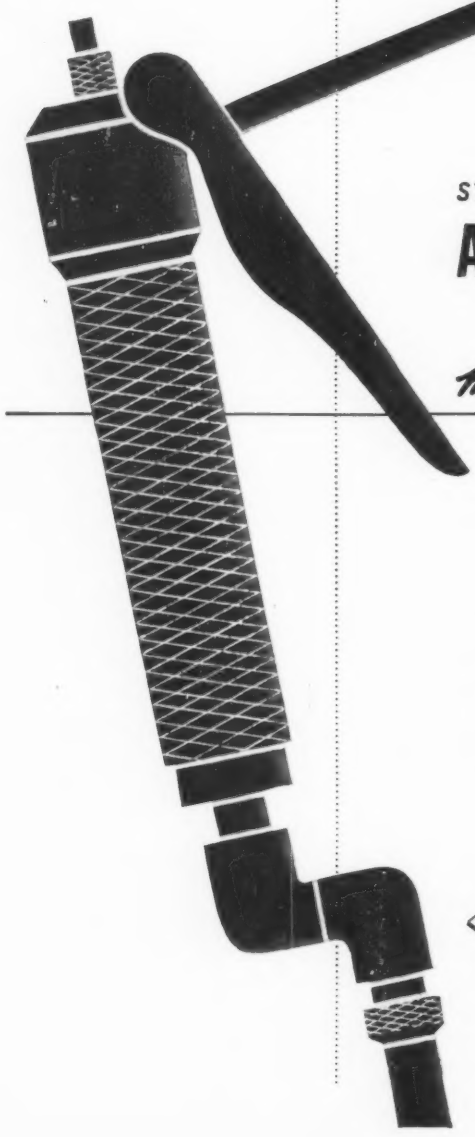

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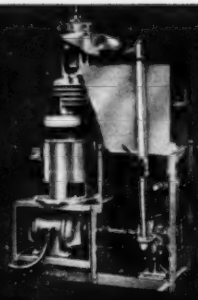

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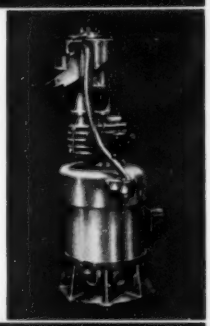

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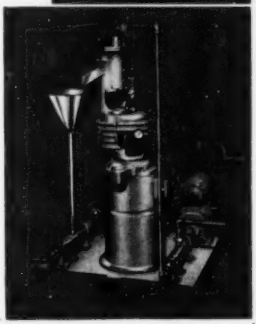

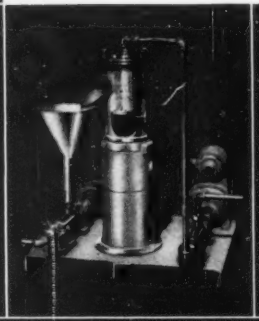

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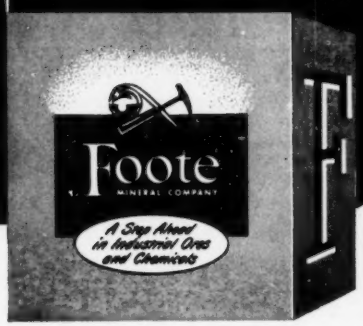

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IN THIS ISSUE

Page

ABOUT THE COVER 6

PRESIDENT'S PAGE 7
by George E. Merkle, Fiske Bros. Refining Company

ANIMAL FATS AS RAW MATERIALS 8
by Dale V. Stingley, Armour Chemical Division

MATERIALS HANDLING IN LUBRICATING GREASE PACKAGING OPERATIONS 18
by Paul F. Lueth, Jr., Union Oil Company of California

THE TECHNICAL COMMITTEE 27
by T. G. Roehner, Socony-Vacuum Laboratories

PATENTS AND DEVELOPMENTS 28

PEOPLE IN THE INDUSTRY 32

INDUSTRY NEWS 36

ABOUT THE COVER

This month's cover picture was taken during the erection of Pilot plant units at Foote Mineral Company's lithium chemical plant at Exton, Pennsylvania.

One of two 22,000-gallon classifiers in the foreground is dwarfed by a 282,000-gallon, 4-deck Dorr Thickener, both of which comprise a part of the new processing facilities.

The adjacent buildings house other Pilot plant units including a six-foot x sixty-foot rotary kiln, digestion tanks, drum filters, spiral and cone classifiers, and various control instruments and equipment.

This Pilot plant was designed to investigate, on a small scale, variables in a new lithium hydroxide production process. When satisfactory operating conditions are established, the Pilot plant will be used to augment current production facilities and serve as the basic design for a new lithium plant. This is part of a long range lithium program currently being undertaken by Foote. Another phase of this expansion program, covering lithium ore production, was illustrated and described in the June, 1951 issue of *The Institute Spokesman*.

President's page

by George E. Merkle, President, N.L.G.I.

RESEARCH IN INDUSTRY

For many years research in the field of science was confined largely to public sponsored institutions and colleges. Its aim was largely for the purpose of gaining more knowledge of various phases of science. It has long been known that available information was only a drop in the bucket compared with what was possible.

Industry was slow to consider research except to a very limited extent, feeling that it was too great a gamble. In research one often gets negative results and these were the cause for discouragement for far too many years. As a result, industry employed chemists as a necessary evil. Much of their work was confined to quality control and a limited amount of experimental or research work.

We might wonder why the industrialists were so slow to make more use of such research since they possess business acumen enabling them to see wise investments. Perhaps it can best be explained when we consider that in the earlier generations science was not a part of the training of the business man and he, therefore, did not fully appreciate its possibilities.

As we approached the past three decades, the possibilities of research in the field of science became more evident and the element of chance was reduced as a result of profitable work being done in this field. In addition to the greatly increased research work in colleges and various research institutions, most industries carry on extensive research programs today.

It is true that some of the great discoveries were the result of some accidental development. Dr. Bakeland accidentally discovered the plastic now known as Bakelite. However, it was in the course of research that the accident happened. One of Eastman's discoveries was considered an accident. There are many such cases but today there are many more that result from planned research.

Research in the field of science is no longer an evil to be tolerated but is recognized as a vital part of many industries. For this reason the appropriations for such work increase annually. It has been estimated that such expenditures now run into billions of dollars. Probably the best billions that are spent since the results are for the good of mankind.

The petroleum and lubricating grease industries have made great strides and will continue to make even greater progress as a result of research. In the past 92 years, the entire industry has grown from zero and now produces a multitude of products widely different in composition and characteristics for practically every modern need.

Research has paid off and handsomely.

the outlook for ANIMAL FATS AS RAW MATERIALS

This article is an address given before the National Renderers Association, November 16, 1951, at Dallas, Texas

by DALE V. STINGLEY
Armour Chemical Division
Chicago, Illinois

IN order to draw a complete picture on the outlook for inedible animal fats as industrial raw materials, it would be necessary to explore the past history of many and varied industries such as textiles, petroleum, sulfur, leather, metal working, and so forth; develop trends, tie these up to the increase in population, the index of industrial activity, the economic outlook in Indonesia, the corn-hog ratio; weigh the pros and cons as to what the administration in Washington might do and make an educated guess.

Frankly, all these and many more factors actually do enter into the picture, since fats and oils are among the most basic raw materials of industrial civilization. Recently, petroleum products and other chemicals have seriously challenged this position, especially in the soap field which is the largest historical outlet for inedible fats and oils.

In considering our subject, it is necessary to employ a statistical approach in order to make a factual presentation. While we have not gone into all of the details listed above, we have to the best of our ability considered the major factors involved. We should discuss: First, a little past history, as shown in Table I and Chart I, and what this indicates as a probable future trend; then, the current situation illustrated by Charts II and III; and last, a description of the major industrial processes employing inedible animal fats—their requirements and their possibilities.

Table I and Chart I show rather convincingly that certain definite trends do exist and the time factor involved (the extent of these trends) leads one to conclude that these are well-established trends which can be expected to continue.

From the column headed "Apparent Production Inedible Tallow-Grease" we must conclude that there is a steady growth in the annual production rate of these products. Further consideration and a correlation with population figures leads to the conclusion that the increase in population creates a greater demand for meat and the natural consequence of supplying this demand is a greater supply of by-product inedible animal fats from the renderer's plants.

In Chart I we have depicted population figures from the Bureau of Census from 1900 to the present, compared with livestock figures from the Department of Agriculture over the same period. This shows most clearly the relationship which exists and except for periods of economic depression, livestock numbers have increased steadily with population.

Returning to Table I in the column headed "Use in Soap" we can trace the declining use of fats in the soap kettle and going further to columns headed "Soap Production," "Synthetic Production," and "Total Detergent Per Capita Disappearance," we are forced to the conclusion that synthetic detergents have supplanted soap or at least have fulfilled the growing need for detergents at the expense of soap in recent years.

We can also surmise that the use of synthetics will continue upward for some time to come, possibly at a somewhat slower rate until an economic balance is reached with soap. This is not an economic problem alone since public acceptance and a continuing demand for synthetic detergents, based on performance, has been a major factor in their growth.

SINCE about 1943 the production of soap would have been materially less if it had not been for the employment of a special tallow soap emulsifier in the synthetic rubber program. Figures are not available, but, based on the amount of GR-S type synthetic rubber produced and the percentage of soap required, this figure probably exceeded 75 million pounds of tallow in 1945 dropping to an estimated 30 million pounds in 1950.

Competition for this market from rosin soaps in the production of "cold rubber" has made itself felt in recent years to the detriment of tallow soaps for this usage.

Going back again to Table I, the column headed "Net Exports-Imports," we can trace our requirement picture from that of a net importer in the past to one of a sizable exporter of inedible tallow and grease at the present time. The importance and need for maintaining these export markets is apparent since we must conclude that the lessening demand and anticipated increased production will require even larger exports in the future, unless additional domestic outlets can be developed.

The next column, "Apparent Industrial Consumption," is derived as the difference between Column One and Column Two plus Column Three and can be considered reliable only to the extent that little change is shown in industrial consumption.

Chart II, Column One shows Total Inedible Tallow and Grease reported used in 1949. Column Two shows a breakdown of the various secondary fat products used, and combines the end productions of both renderers and processors to make a complete picture. Column Three charts the disposition of all products to final end use. We have done this to point up the comparative importance of the various outlets for inedible tallow and grease.

It is apparent that industrial outlets account for only a fraction of the total use of inedible animal fats and that the expansion of these markets would have to be tremendous to offset a major decline in the use of fats in the soap field or the loss of our export markets. Such an increase is not impossible. The rate of growth in the chemical industry can be spectacular as witnessed by the synthetic detergent industry which in the past ten years has gone from 40 million to 1200 million pounds annually, approximately 3000 per cent.

In view of the fact that a renderer's production goes both to end use directly and to processors of secondary products, some further analysis is required to show the outlets which are of primary interest to this group. Chart III supplies this information.

TABLE I

APPARENT PRODUCTION AND CONSUMPTION
INEDIBLE TALLOW & GREASE
INDUSTRIAL USE, SOAP, SYNTHETICS, ETC .

POUNDS IN MILLIONS

Year	Apparent Production Inedible Tallow-Grease[1]	Use in Soap[1]	Net Exports-Imports[1]	Apparent Industrial Consumption	Soap Prod.	Synthetic Production[2]	Total Detergent	Total Pounds Detergent Per Capita Disappearance
1936	817	759	+ 55	113	3300	3	3303	25
1937	855	708	— 0.3	147	3400	7	3407	26
1938	929	799	— 1.	129	3200	10	3310	25
1939	1127	905	— 3.	219	3700	20	3720	28
1940	1375	1043	— 4.	328	3700	30	3730	28
1941	1551	1368	+ 25.	208	4600	40	4640	34
1942	1741	1528	+ 60.	273	4100	60	4160	30
1943	1649	1349	+ 31.	331	4100	80	4180	29
1944	1942	1530	+ 8.	420	5000	100	5100	35
1945	1750	1365	+ 22.	407	4500	200	4700	31
1946	1658	1220	— 15.	423	3900	300	4200	28
1947	2023	1526	— 63.	434	4400	400	4800	32
1948	1943	1451	— 82.	410	4000	600	4600	32
1949	2134	1346	—424.	364	3400	800	4200	27
1950	2308	1363	—533.	412	3500	1200	4700	30
6 Mo. 1951	1230	698	—242.	290	——	611	——	—

+ Imported
— Exported

[1] Compiled from Bureau of Census Reports
[2] "Soap and Sanitary Chemicals," March, 1951

IF we refer to Chart III, we get a picture of the percentage sales of primary inedible animal fats as they go from the renderer's plant. As shown in Column Two, tallow goes in largest volume to soap (which includes refining), and in much smaller volume to fat splitting, lubricants, and others. In the case of grease, shown in Column Four, we find first, soap, then pressing, fat splitting, lubricants, and miscellaneous outlets. In both cases materials exported can be considered as disposable surplus undesired for domestic consumption at prevailing world price levels.

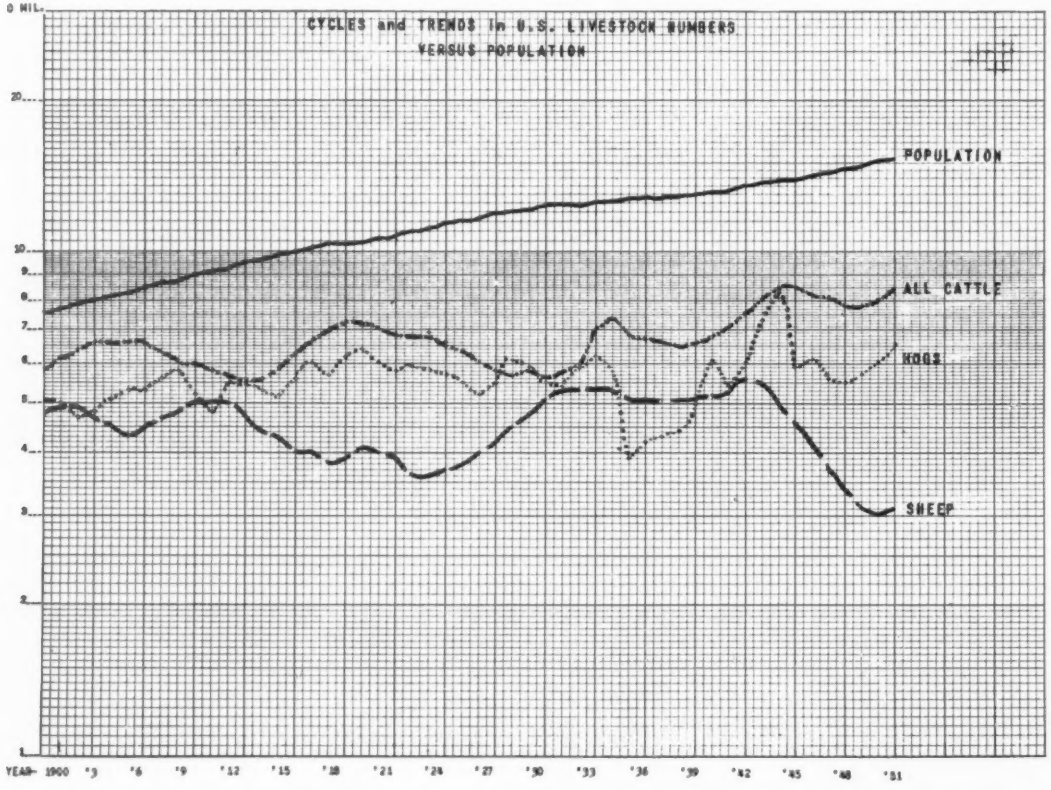
The first conclusion we can draw from Chart III is that the renderer of inedible tallow and grease has all his "eggs in one basket" and that he faces a serious problem if further inroads from synthetic detergents reduce the production of soaps, since the industrial field, fat splitting, lubricants, pressing and other uses account for only a minor volume of inedible animal fats.

There are a number of explanations as to why the industrial consumption of inedible animal fats has not shown material gains in recent years, a major reason being economic, because of lack of price stability and high prices which have discouraged the utilization of inedible animal fats.

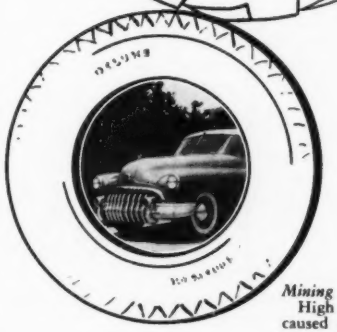
In the past, it may not have seemed important to a renderer whether or not lard oil or a petroleum product was used for cutting oils, textiles, leather and the like. But today, due to the supply position of inedible animal fats, these markets could be extremely attractive. Unfortunately, the same thing that happened in the soap field also hit the industrial producer of inedible fat products and the growing demand for these products has been supplied, in many cases, by substitute materials.

Recently, this trend has started to change and the production of secondary products, including fatty acids, lard oil and chemicals, has gained ground steadily. This is due almost entirely to the chemical research programs set up by private industry and the Department of Agriculture to find new uses for fats and oils. While most of these programs have primarily stressed vegetable oils, the inedible animal fat producer stands to benefit from the general knowledge gained from these studies. Much of the success of this pro-

CHART I



ONE GOOD TURN DESERVES ANOTHER



SO . . .

turn to BATTENFELD Multi-Purpose Barium Grease right now! Ready for immediate delivery!

One good turn is the praise automotive, industrial, and agricultural users have heaped on Battenfeld's Multi-Purpose Barium Grease. Its resistance to heat, water . . . and its ability to cushion against shock have won unanimous approval for Battenfeld Barium.

Another good turn is your recommendation to customers that they try this tough, high-adhesive lubricant. It can be the turning point in their profit structure. With Battenfeld Barium Automotive users will lubricate vehicles in 40% less time, with 33% less grease, and with one grease and one gun instead of four greases and four guns.

Still another good turn is the economy of Battenfeld Barium in industry. Its flexibility makes it extremely usable in all types of industrial lubrication. The use of Barium means longer intervals between lubrications.

Important to manufacturers is the fact that Battenfeld Multi-Purpose Barium Grease is unsurpassed as an industrial lubricant under high temperature and/or wet operating conditions. It resists combination with water and is highly effective as a rust preventative on any metal surface exposed to moisture.

We can't possibly get all the advantages of Battenfeld Multi-Purpose Barium on just one page. But its *cleanliness, good pumpability, speed in flowing, cohesion,* and *shock cushioning* are but a few of the many reasons why you should be using or marketing Barium right now.

Mining Company Reported:
High temperature and wet conditions caused extreme lubrication difficulty of conveyor between copper smelter and cooler. Out of 32 lubricating greases tested, Barium was only one found satisfactory to lubricate bearings. Lubrication costs were cut to one-quarter and lubricating frequency reduced from twice daily to once every four days.

Service Station Reported:
Average of 412 cars were greased per month and 300 lbs. of ordinary greases were used. With Barium the same amount of cars were greased using only 200 lbs. of grease—a one-third saving on lubricating grease alone!

READY FOR IMMEDIATE DELIVERY TO YOU, Battenfeld Barium Grease may be bought in any quantity and can be packaged under any private label. For complete information—including price—write or send post card today. No obligation, of course.
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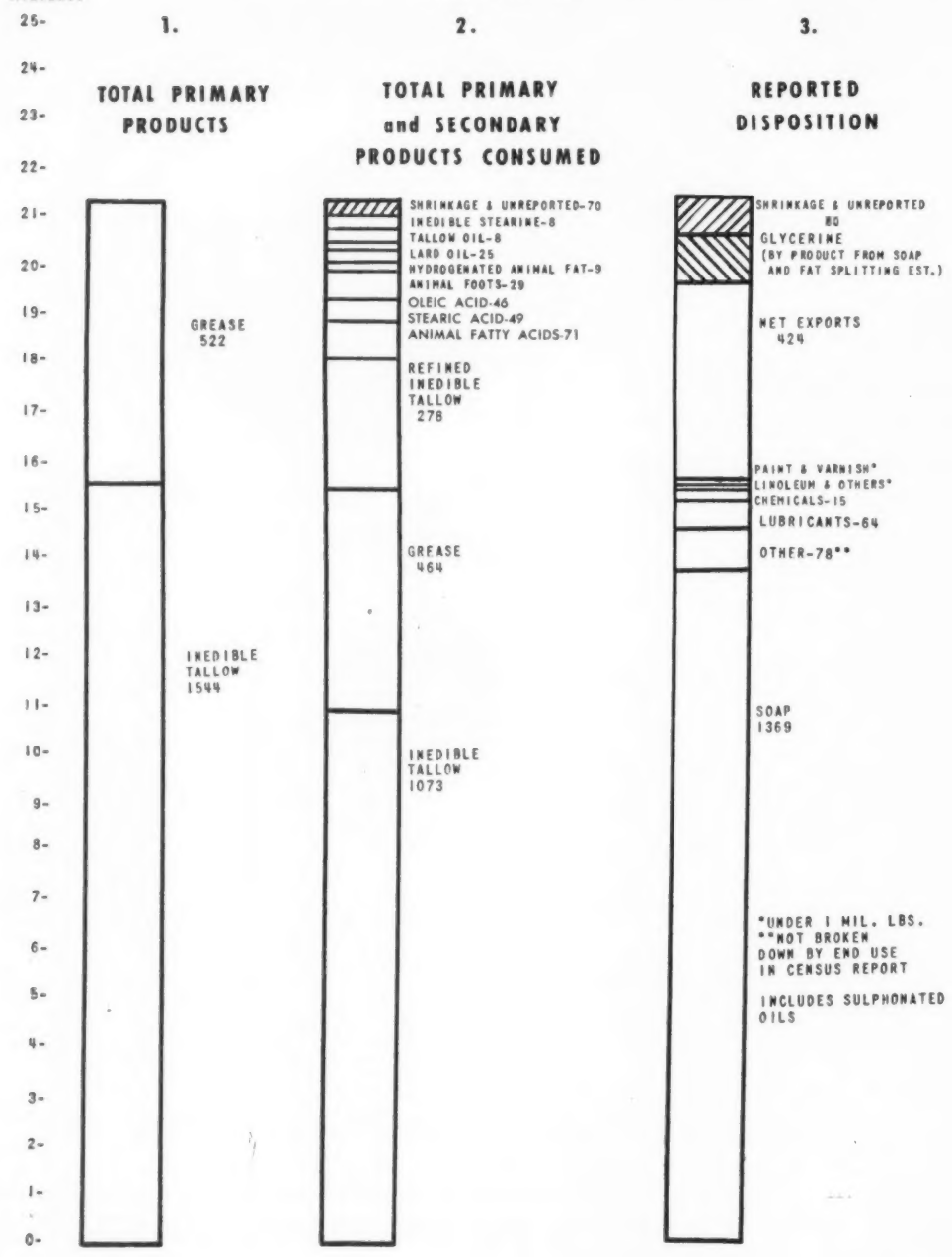
CHART II

REPORTED END USE PRIMARY & SECONDARY INEDIBLE ANIMAL FATS
CENSUS REPORT 1949



gram has resulted from the development of standardized industrial fat products by the processors of these materials.

In our modern industrial scheme, the key to our enormous productivity has been standardization. Natural products, such as fats and oils, vary greatly in quality and composition. Many years ago grading standards were set up for trading purposes. During the second world war, minimum standards (Table II) for pricing purposes were established under MPR 53 effective August 14, 1943, and currently these standards are continued as the basis for price ceilings under CPR-6, Amendment 2, effective March 8, 1951. These standards were based on the requirements of the soap industry and have in general been too broad and indefinite to meet the needs of the industrial consumer

As a result, various purchase specifications have been set up by individual companies to assure that the meterial they buy will be suitable for their needs. This trend is also being followed in some industrial association groups. The renderer who fails to take into consideration the requirements of the industrial user will eventually find himself restricted in outlets for his production. This is already true to a considerable extent, since these users now buy from selected sources or adopt standardized products such as fatty acids, hydrogenated oils, lard oils, and other refined products to guarantee the uniformity they require.

THE need for standardized products, and for fat products with modified chemical or physical properties is the reason for the existence of a sizable industry, which takes the renderer's products, further processes them and in turn supplies these materials to industrial users. In general, these secondary producers are set up to employ commercial grades of tallows and greases, but in many cases their needs are best served by more stringent specifications with the result that they must be selective in their sources of raw materials.

In the fat splitting, or more properly, the fatty acid industry, two grades of inedible animal fat are commonly employed. If the fatty acid manufacturer is a producer of hydrogenated acids, the ideal material for his purpose is a tallow or grease low in free fatty acid content, which can be refined with a minimum of loss before hydrogenation. For the production of distilled animal fatty acids, sold as such or for the production of stearic acid and red oil (oleic acid), his requirements are less stringent.

The free fatty acid content of this lower grade stock is not important except for the glycerine content if the titer, iodine value and unsaponifiable are in line. Unsaponifiable is particularly undesirable since most fatty acid processors are not equipped to remove excess quantities. Altogther, the value of inedible animal fat to a fatty acid producer is not greatly different from the soap kettle value, however, this does not hold true for the lard oil manufacturer.

Lard oils are produced from grease (inedible lard). Here the free fatty acid, color, unsaponifiable content and titer are all of importance. Lard oils are sold basis standard free fatty acid content, color and pour point, and unless the proper starting raw materials are available, the cost of production reaches losing economic proportions quite rapidly. Over the past years the lard oil industry has lost ground steadily in competition with petroleum chemicals. While a stable inedible animal fat market at a lower price level would make it possible to regain some lost ground, the volume entailed would be of minor importance when compared with fatty acids, lubricants and the potential chemical outlets being explored.

TABLE II

STANDARD GRADES INEDIBLE TALLOW-GREASE*

	Titer Min. °C.	F.F.A. Max. %	M.I.U. Basis %	F.A.C. Max. Untreated & Unbleached
Tallows				
Industrial fancy and/or acidless tallow	41.5	1	1	5
Fancy	41.5	4	1	7
Choice	41.	5	1	9
Prime, renderers prime packers, or extra	40.5	6	1	13 or 11B
Special	40.5	10	1	19 or 11C
No. 1	40.5	15	2	33
No. 3	40.5	20	2	37
No. 2	40.	35	2	No Color
Greases				
Choice white	37	4	1	11
A, white	37	8	1	15
B, white	36	10	2	19 or 11C
Yellow	36	15	2	37
House	37.5	20	2	39
Brown	38	50	2	No color

*O. P. A. standards established by MPR-53 effective August 14, 1943. Continued by O. P. S. in CPR 6, Amendment 2, March 8, 1951.

In the field of lubricants we have a similar story; there has been a trend away from tallows and greases and toward fatty acids because of standardization. Newer developments in this field point farther away toward synthetic chemicals and vegetable oils as sources for grease-making materials. From all indications the outlook for expansion in this direction is not too bright.

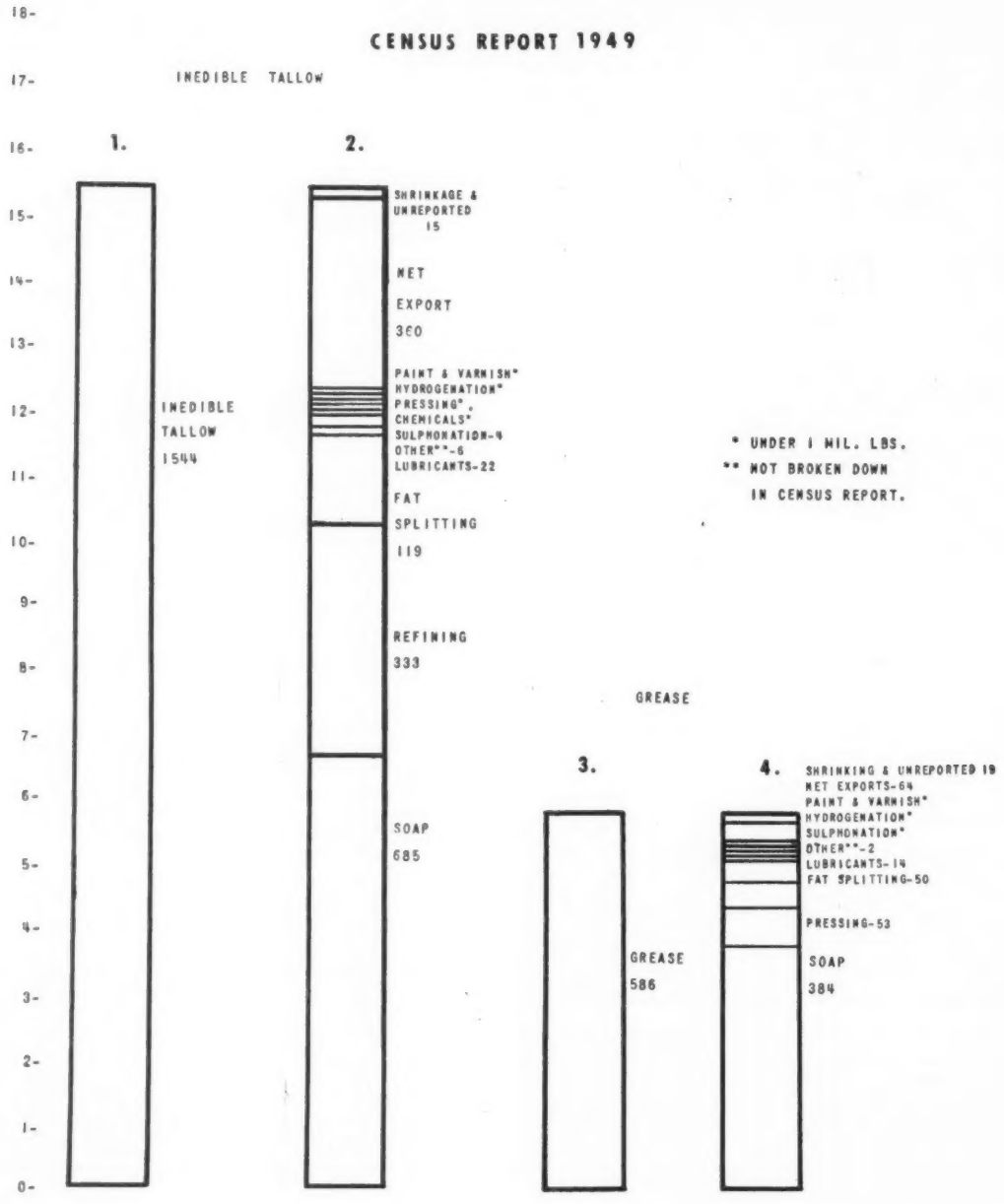
There is, however, one bright spot in this entire picture and this is the development of new chemicals from inedible animal fats. The potential in this direction is truly unlimited and industrial chemicals from fats in commercial production are finding their way into such diversified fields as plasticizers, synthetic resins, emulsifiers, germicidal agents, synthetic detergents, waterproofing fabrics, floor wax, road building, secondary petroleum recovery, and so forth. At least four major producers working in this field are now in substantial production. A new plant for the production of fatty chemicals, some to be used in synthetic detergents, started up production with a conservative requirement of 5,000,000 pounds of tallow per year. More plants will surely follow as further knowledge is gained on the chemical possibilities of inedibile animal fats.

CHART III

REPORTED USAGE OF PRIMARY PRODUCTS

INEDIBLE TALLOW and GREASE

CENSUS REPORT 1949



ACTUALLY, the investigation of inedible animals fats by the chemical industry has just begun and already on the horizon new outlets are beginning to appear. It is possible, and in fact very probably, that synthetic detergents based on animal fats will help regain the outlets lost in the soap market. This would be the ideal solution, A promising start has been made in this direction. If successful this offers the most immediate and the most permanent answer to what could develop into an overabundant supply of inedible animal fats. Properly handled, abundant supplies need not cause embarrassment. For our part, we prefer to think of this in terms of opportunity. If we have abundant supplies of inedible tallows and greases at reasonable and stable prices, these immediately become more attractive as industrial raw materials. Never in the history of industrial civilization has any attractive raw material gone begging for uses.

In projecting the future we are considering probabilities which past experience and a study of the factors involved indicate could become realities. In the case of inedible animal fats, it is believed that a very definite major probability exists and nothing is apparent in the foreseeable future which would materially change this picture.

BRIEFLY stated, our conclusion is that it would appear most logical to expect:

1. A continued increase in the production of inedible animal fats proportionate to the anticipated population increase and the consequent probable expansion of the livestock industry to supply the increased demand for meat.
2. Some further loss of markets in the soap industry to synthetic detergents from petroleum sources. However, as the pressure of supplies reduces the price of inedible animal fats to a competitive basis these losses of markets will be minimized, but the public acceptance and demand for synthetic detergents will probably prevent soap from regaining lost ground.
3. A moderate increase in the consumption of inedible animal fats in industrial uses, principally as secondary products, such as fatty acids, chemicals, industrial oils, etc., with chemicals expanding rapidly over the next ten years.
4. An annual surplus of better than 750 million pounds within the next five years, which will exert tremendous pressure on the development of new uses for inedible animal fats and which will in all probability be relieved mainly by exports as a temporary expedient.

It is true that innumerable minor probabilities exist but most of these would appear to be of short duration and probably would not alter the long term picture. For example, war, crop failures here or in the rest of the world, stop-gap government regulations and other expedients can and probably will occur; but the final solution to the disposition of our increasing production of inedible animal fats must lie in the development of new outlets within our own economy. This could be much simpler and come quicker than we might think.

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DOW CORNING

Silicone Notes

ON LUBRICATION

REFERENCE NO. SL-53

FILE SILICONE LUBRICANTS

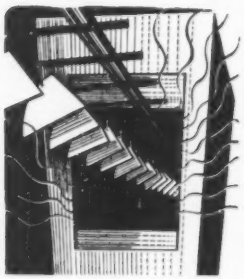
Make sure you have basic data sheets 8G-2, 550lb. 7102. If misplaced write Department N-16.

DOW CORNING CORPORATION
Midland, Michigan

DOW CORNING 41 GREASE

Bearings working at 375°F. in an oven conveyor system for baking the finish on electrical parts, failed frequently in spite of weekly relubrication. And many finished parts had to be rejected because of flaws caused by oil bleeding out of the bearings and dripping onto the uncured paint. Since using Dow Corning 41 Grease, bearing failure and rejects caused by melting grease have been eliminated, and the bearings have to be relubricated only twice a year.

After more than 30 months of service, conveyor bearings lubricated with Dow Corning 41 Grease are still running smoothly through an enamel drying oven operating at 300°F.



Bearing failures have been eliminated, maintenance and lubrication costs have been reduced to the vanishing point; production has been increased by at least the $100 worth of parts a day that were formerly rejected because the finish was spoiled by the dried-up, graphite-kerosene lubricant that fell down from the bearings.

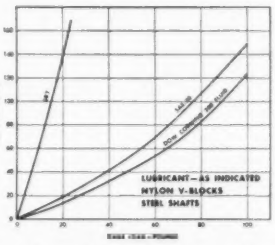
As an antiseize agent on the die threads of glass forming machines, Dow Corning 41 Grease makes it easy to take dies apart even after 6 months of operation at 340-380°F. Similarly, die assemblies used in molding phenolic closures formerly froze so tight that a welding torch was used to cut the dies and bolts apart. The same assemblies lubricated with Dow Corning 41 are easy to disassemble after long exposure to heat and steam. Hold-down bolts on rubber and plastic presses are also lubricated with Dow Corning 41 to prevent seizure.

DOW CORNING 200 FLUID

The ability to lubricate is a complex of so many variables that no absolute value can be given for any lubricant. Speed and load, bearing design and metal combinations, time and temperature all have a more marked effect on wear than the lubricant itself has. That fact has been very well demonstrated in the case of the silicone lubricants.

Take the Dow Corning 200 Fluids, for example. Our first experience indicated that these fluids had little, if any, potential value as lubricants. That seemed to be true in spite of the fact that they have all of the other properties required of an ideal lubricant. They show remarkable resistance to oxidation and to gumming for an indefinitely long period of time and at high temperatures. Volatility is very low and they have an exceptionally flat viscosity-temperature slope.

Further investigation showed that the Dow Corning 200 Fluids are, in fact, excellent lubricants under certain conditions. They are, for example, the best of all lubricants for plastic and fiber gears and bearings. In this case, and unlike most silicone lubricants, the Dow Corning 200 Fluids seem also to have better load carrying capacity as indicated by this graph based on Falex test results.



The superiority of these fluids as lubricants for nylon gears and bearings is further indicated by the fact that wear should be more exactly defined as deformation due to the heat of friction rather than loss of material due to wear.

DOW CORNING CORPORATION • MIDLAND, MICHIGAN

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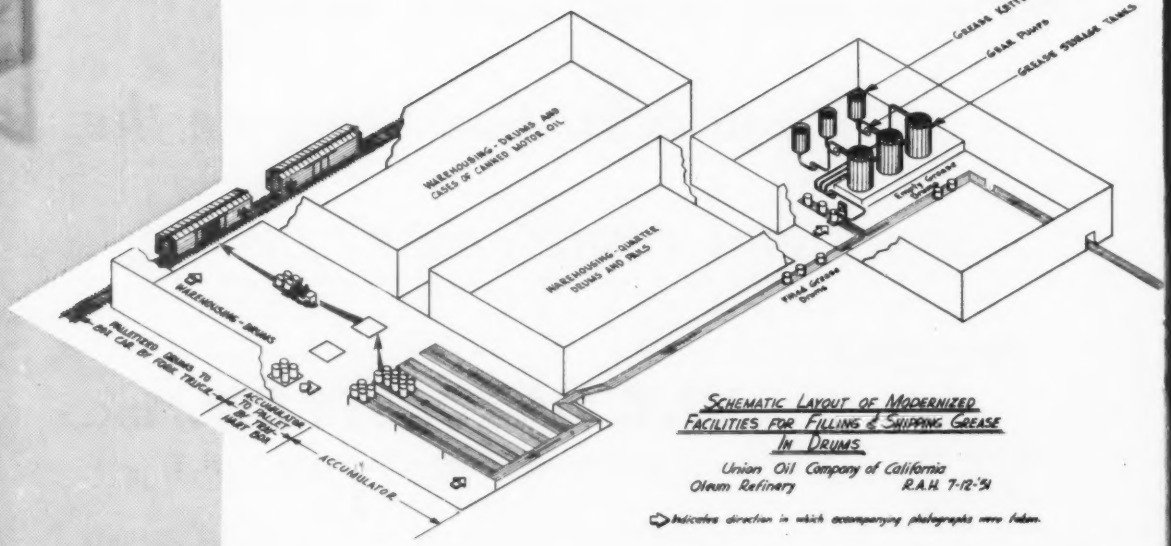
MATERIALS HANDLING

IN LUBRICATING GREASE PACKAGING

PAUL F. LUETH, Jr.
Union Oil Company of California
Rodeo, California

FROM obscure but yet adventuresome beginnings about 93 years ago, when "Colonel" Edwin L. Drake drilled the first oil well near Titusville, Pennsylvania, in 1859, this nation's oil industry has grown to one of considerable prominence and influence. Materials handling has played an important part throughout this comparatively short period of growth and development of an industry which, nationwide, currently produces commodities selling for more than 10 billion dollars annually.

When the industry was in its infancy, oil was commonly transported in wooden barrels which were moved overland by horse-drawn wagon and on navigable waters by barge. This gave rise to the term "barrel" as the accepted unit of


GREASE KETTLES
GEAR PUMPS
GREASE STORAGE TANKS
WAREHOUSING - DRUMS AND CASES OF CANNED MOTOR OIL
WAREHOUSING - QUARTER DRUMS AND PAILS
WAREHOUSING - DRUMS
PALLETIZED DRUMS TO BOX CAR BY FORK TRUCK
ACCUMULATION TO PALLET LOAD BOX
ACCUMULATOR

Schematic Layout of Modernized Facilities for Filling & Shipping Grease in Drums

Union Oil Company of California
Oleum Refinery *R.A.H. 7-12-'51*

Indicates direction in which accompanying photographs were taken.

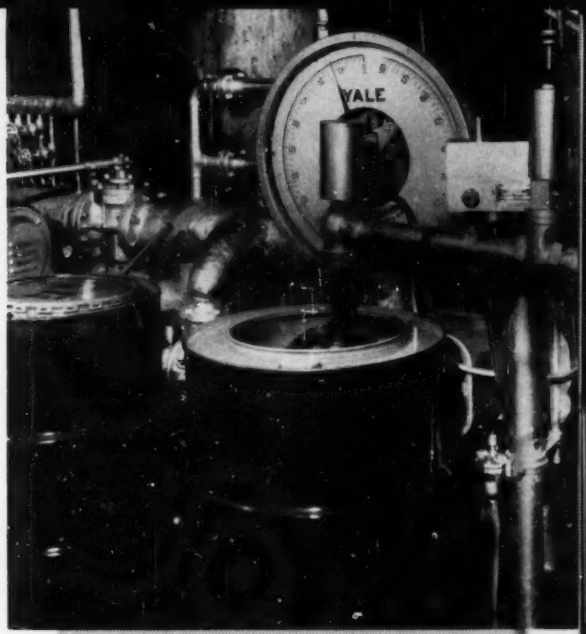
measure in petroleum circles, and this unit is retained today, the barrel being equivalent to 42 U. S. gallons.

Petroleum Industry's Approach to Materials Handling

As the oil industry's operations developed to a commercial scale, engineers were quick to take advantage of the fluid characteristics of the materials to be moved as a logical approach to the solution of their materials handling problems. It became common practice to store raw materials, intermediates, and finished commodities in tanks, to employ pipelines as a convenient type of conveyance for transportation overland, and to utilize pumps to supply the mechanical energy for movement. When these time honored methods failed to satisfy completely the needs of the rapidly expanding enterprise, the shape of the tank was changed slightly, and it reappeared to serve on rails in the form of the tank car, plying on the high seas as the tank-ship, and, more recently, speeding over our modern highways as the familiar truck transport.

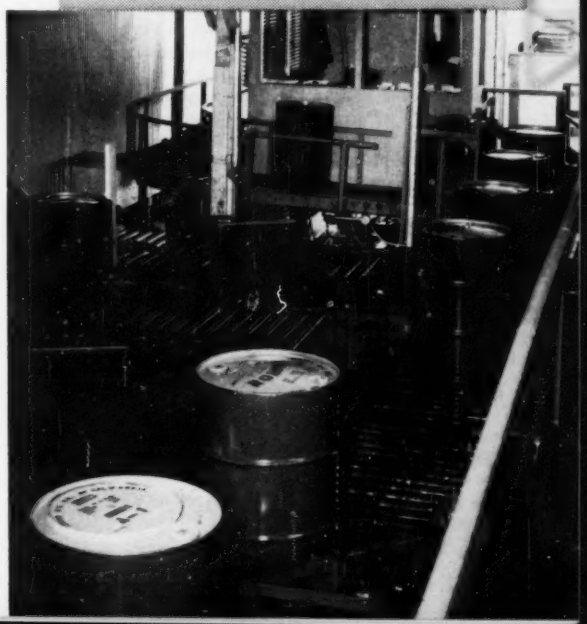
All materials handling problems in petroleum processing were not as rapidly solved as were those associated with these basic movements of fluids. With the introduction of thermal and catalytic cracking processes, new problems in the handling of solids were encountered and solved with even greater ingenuity. Solid coke, formed in the coke drums of delayed coking plants as a result of thermal cracking is removed and carried to coke piles efficiently by means of *hydraulic sluicing*. The movement of solid catalyst through huge reaction vessels and, in turn, through regeneration kilns, today is accomplished by *fluidizing* the solid.

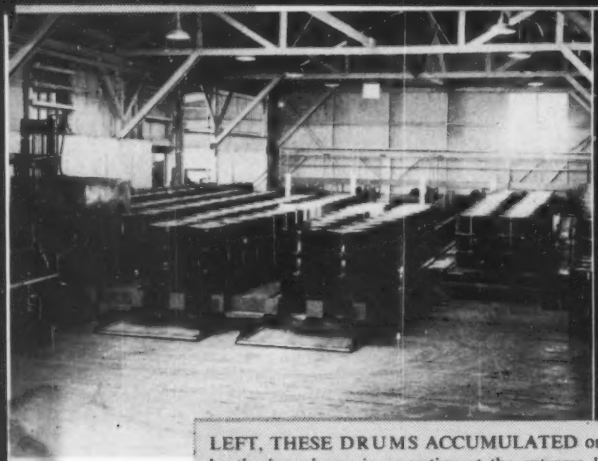
This concept of materials handling involves dividing the solid into fine particles that can be carried in a gas stream confined in a pipe. In this manner, some of the largest fluid catalytic cracking plants circulate 3000 to 4000 tons of solid catalyst per hour. The recently developed hypersorption process for the separation of very light petroleum fractions has introduced many new concepts in continuous circulation of granular solids down through adsorption vessels and up through lift lines.



TOP, THIS FILLING SCALE, equipped with an air operated filling device insures precision filling of lubricating grease drums. The flow of grease is automatically shut off when the drum has been filled to the desired weight.

BOTTOM, THE ACCUMULATOR CONVEYOR is used to segregate drums by commodity or order. The selector operated by the man in the booth, provides a means whereby drums can be automatically diverted to the appropriate lateral, where drums are collected in equal double rows.





LEFT, THESE DRUMS ACCUMULATED on gravity roll lateral conveyors, await removal by the box shown in operation at the extreme left. With this special fork truck, four drums are lifted from the accumulator simultaneously for palleting.

RIGHT, THE UNIT LOAD of four palletized drums is moved from the palletizing site or from warehouse stock to the box car on fork lift trucks. Inside the car, drums are removed from the pallet manually.

Aside from these phenomenal developments in bulk handling of materials, there have been equally significant strides made in the handling of the more conventional packages used extensively for the marketing of such petroleum products as greases, lubricating oils, asphalt, petroleum wax, and other specialty products.

The lowly barrel has not been discarded, but rather has inspired the adoption of many similar containers, such as the quarter barrel[1], the 35-pound pail, the one-quart and five-quart can, the hex carton for asphalt, and, more recently, the collapsible synthetic rubber "drum." Although the volume of products sold in these packages is small in comparison with the industry's bulk operations, management has been fully aware of the necessity for keeping pace in these small package operations. The production, package filling, and shipping of grease affords a typical example of the application of conventional materials handling techniques in this fascinating oil business.

Grease Packaging — Former Techniques

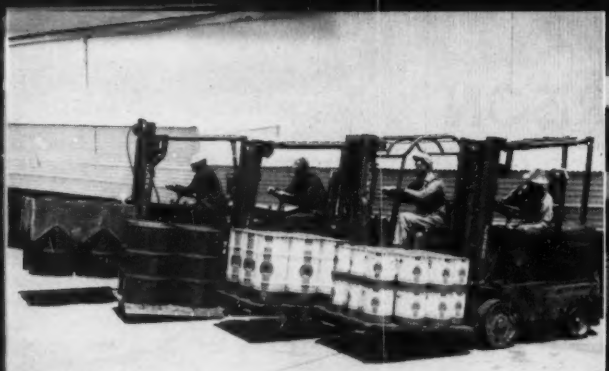
Greasemaking is one of the few operations in petroleum refining that remains to be conducted for the most part as a batch operation. Ingredients are charged to a grease kettle, where such unit operations as mixing, heating, and cooling are performed until the batch is completed and ready for drawing. It is at this point that the packaging operation begins.

To gain a full appreciation of the advantages derived from the modernization of methods for grease packaging and shipping, it is essential first to obtain a concept of procedures formerly employed. Containers were brought to the site of the grease kettle, since they were filled directly from the bottom of the kettle, which confined this operation to an area already restricted by auxiliary equipment required to operate the kettle. Packaging could not be accomplished while the batch was in preparation, and a new batch could not be started until the rather slow process of filling the previous batch had been completed.

Filling by weight was accomplished on an ordinary platform scale, with no automatic features. The flow of grease from the kettle into the container was controlled and shut off manually. Allowance for container tare weight was established by an average container weight and was not absolute for each individual container. Other auxiliary manipulations, such as crimping of lids and drum labeling were performed manually.

Movement of grease drums was a laborious and time consuming operation. Empty drums from storage were hauled to the site of filling operations on a hand-drawn wheeled truck carrying from four to six drums, and thus each drum was handled at least twice before filling. Filled drums were taken in like manner either to warehouse stock or to the shipping car. Drums going into stock were manhandled four times before loading. Frequently drums being loaded directly for shipment first required manual segregation into several orders, and therefore were handled a like number of times. The time and effort required for these manual operations is apparent when it is recognized that a drum of grease weighs 450 pounds. Worthy of note here is the fact that each hand truck haul with "pay load" necessitated the time-consuming return of the empty truck and men for a new load.

[1]One quarter barrel contains approximately 15 gallons.



LEFT, THESE ARE TYPICAL UNIT LOADS employed in package handling operations. From left to right are shown the box used to palletize the unit load of four drums and conventional fork lift trucks carrying four drums, 9 quarter barrels, and 28-35 pound pails.

RIGHT, THIS TRUCK EASILY LIFTS a unit load of 50 cases of lubricating oil, palletized on a sheet of fiberboard. This accessory has completely eliminated the need for permanent wood pallets.

It is not surprising that these facilities and methods were recognized as a definite bottleneck in the efficient expansion of grease production to meet an increasing demand. Following World War II, manufacturers of materials handling equipment turned their attention to the development of equipment suitable for use in these operations, and petroleum process engineers made exhaustive surveys of anticipated requirements and provided facilities that exemplify today's concepts of materials handling.

Grease Packaging Divorces Production

Grease, still compounded in the original kettles in batches, is now pumped to tanks for storage on completion of the batch. This new concept of storing grease in tanks provides necessary surge for flexibility, making the packaging operation more nearly independent of the production phase. From these tanks, the grease is pumped to the filling point, which is no longer confined to its former site at the base of the kettle. Drums are filled by weight, on a scale whose roller platform is mounted at conveyor level. This scale is equipped with a rapid tare adjustment and an air-operated filling mechanism, by means of which the flow of grease into the container is automatically interrupted when the desired weight has been measured into the drum.

The movement of drums from storage to the filling point and thence to warehouse storage or shipping platform has been greatly improved by the installation of gravity and power roller conveyors. Filled drums are pushed off the gravity rolls on the scale platform to a short gravity section for crimping of the lid, now accomplished with an air-operated crimper, and for spray stenciling for product identification.

After completion of these operations, the drums are not handled or lifted manually until they are placed in the box car for shipment. Filled drums move on live conveyors from the filling site to an accumulator, where they can be mechanically segregated either by commodity or shipping order. Here, a dispatcher, sitting in a control booth at the head of the accumulator, operates a push button controlled electrical selector system. The lateral conveyer to which each drum is to be diverted is thus pre-selected, and all subsequent conveyor action for the accumulation of drums on appropriate laterals is automatic.

At the end of the accumulator, drums are transferred to pallets by means of a box, mounted as an accessory on a conventional fork truck. A hydraulically operated clamp system secures the drums for lifting, and four drums are lifted in this manner from the accumulator and placed on a pallet for storage or for movement to the shipping carrier.

Productivity Is Increased

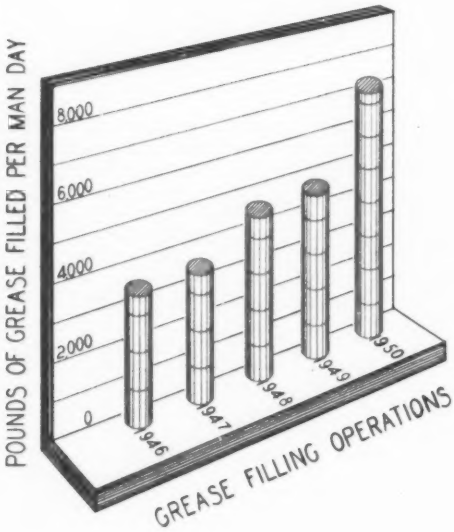
These modernized facilities now permit the filling of about 300 drums of grease per day. The addition of conveyors and lift trucks for plant transportation makes it possible to move and ship 900 drums per day with ease.

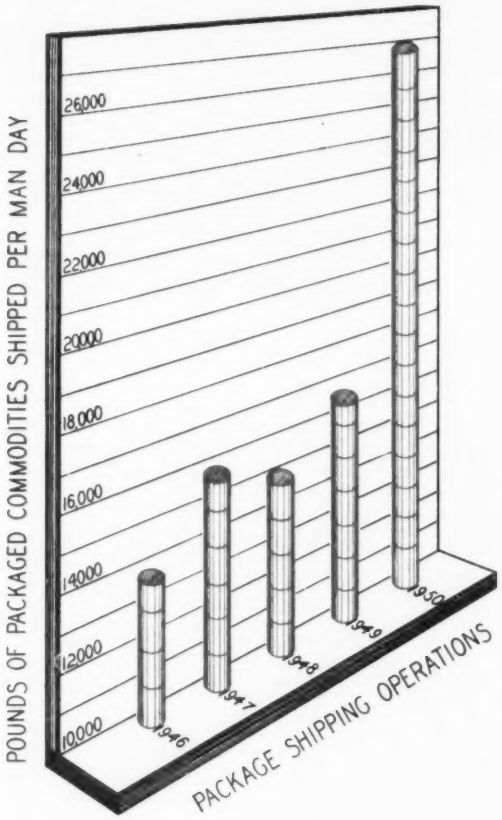
The question of what has been gained by the adoption of new materials handling techniques is a logical one, and the answer, to a great extent, is found in the accompanying graphical illustrations. The facilities described were completed and put in operation during the latter part of 1949. A comparison of the statistics for 1950, when the new methods and equipment were in full use, with the four years immediately preceding indicates that the pounds of grease filled per man day rose to about 1.5 times its former ratio. Also evident is the increase in total weight of packaged commodities shipped per man day to about 1.6 times the former level.

FIVE YEAR COMPARISON

OF LUBRICATING GREASE FILLED AND PACKAGED COMMODITIES SHIPPED PER MAN HOUR

Clearly evident from these two charts is the effect of modernization of materials handling facilities late in 1949.





Intangible Gains

Manpower thus saved has been made available for reassignment to operations requiring greater skill and dexterity. Many less tangible advantages are also attributed to these new methods:

1. *Standardization of operations has assisted planning.* A planning supervisor now performs an important function in these packaging and shipping operations. This coordinator is essential to insure that grease kettle time is occupied to maximum advantage, that grease production, filling, warehousing, and shipping are performed as well coordinated operations, and that all these functions are directed toward the ultimate objective of completion and shipment of each individual order on time. This planning is greatly facilitated by the adoption of the new materials handling program.

2. *Utilization of space is more efficient.* Operating facilities were situated in a limited area. Improved materials handling, resulting in a more efficient utilization of the space available, has permitted the expansion of these overall filling and shipping operations to meet an increasing demand

without an appreciable increase in the total area previously devoted to these activities.

3. *Safety record has improved.* Reduction in the manual effort required by employees, together with the standardization of operations, has resulted in a marked reduction in accident frequency.

4. *Employee morale is maintained at a high level.* The installation of these new facilities was accompanied by an uplifting of employee morale as the individual worker became aware of management's desire to provide him with the best tools available. Employees exhibit a high sense of pride in their plant. The reduction in manual effort along with safer working conditions also has contributed to improved worker morale.

5. *Standards of housekeeping and maintenance have improved.* As compared with former methods, these new techniques of filling and handling containers are characterized by a definite sense of orderliness, which, in itself, encourages good housekeeping. Moreover, plant improvements are engineered with an eye to ease of cleaning, and experience is demonstrating that a plant that is easy to clean will be kept clean. A high level of maintenance is correlative to a high level of cleanliness, since a clean plant is always easily maintained.

Unit Load Concept Utilized

The unit load concept was introduced in operations as a necessary adjunct to the improved methods of handling packages of petroleum products. At the point where packages must leave conveyors, the unit load comes into play as an efficient tool in their further handling, especially when warehousing of stock is involved.

Insofar as drums are concerned, the unit load is created when four drums are lifted from the accumulator in the plant under consideration. This unit load is maintained until these drums are loaded into box cars.

In like manner, other containers commonly employed as packages for petroleum products are grouped in unit loads: quarter drums are warehoused and handled within the plant in the form of a pallet of nine containers, and 35-pound pails in a pallet grouping of 28 units. To minimize disturbance of these unit loads in materials handling, marketing stations cooperate to the extent of placing orders in multiples of the applicable unit load for the container concerned.

Lubricating oil, packaged for consumer use in one-quart cans, is shipped in fiberboard cases holding 24 cans. These cases are palletized manually on a wide belt conveyor, the unit load of 50 cases being stacked in interlocking fashion on a sheet of 0.09-in. solid fiberboard, 50x46 inches in size.

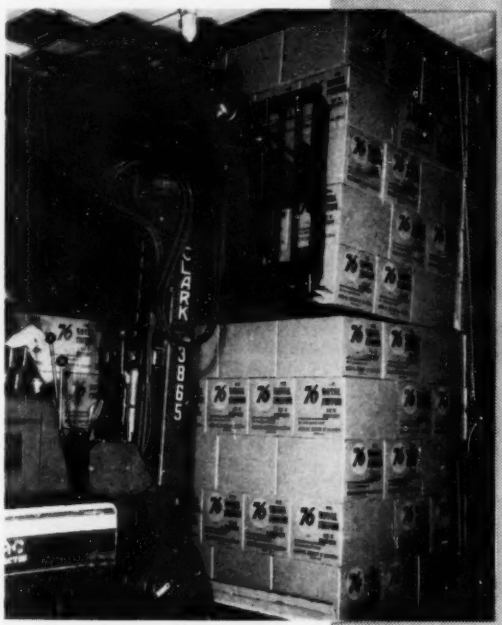
"Truck" Moves Cases Efficiently

The use of a "truck" to move this load represents an application of a new tool for handling cases. A vertical fence, with a gripping mechanism at its base for gripping a protruding edge of the chipboard "pallet," is moved away from or toward the fork truck hydraulically as the unit load is pushed from or pulled onto the wide plate-type forks on the vehicle. Use of the "truck" for this operation has resulted in a substantial saving by the complete elimination of wood pallets.

Still another unit load associated with petroleum package operations is the expendable fiberboard pallet used for the shipment of petroleum wax in slabs. Wax slabs, 12x19 inches in size, are stacked on a fiberboard pallet, in which coiled strips of fiberboard make up the legs, and two sheets of corrugated fiberboard form the pallet deck.

This pallet supports a load of 2500 pounds of wax, which is covered by a specially made kraft paper bag. The package is effectively unitized by the careful placing of four steel bands around the load vertically, making a practical unit for shipment to distant points from which the return of non-expendable pallets is prohibitive in cost.

By the timely adoption of these new materials handling techniques, the petroleum industry has been able to supply to consumers of packaged oils and greases a line of high quality products in an attractive, fully protective container at a reasonable price, despite today's increasing costs of operation.



THE "TRUCK" PLACES its unit load of 50 cases in stock. The wide, pallet-like "feet", the vertical fence which pushes the load off these "feet", and the gripping mechanism at the base of the fence for gripping the fiberboard pallet are evident.

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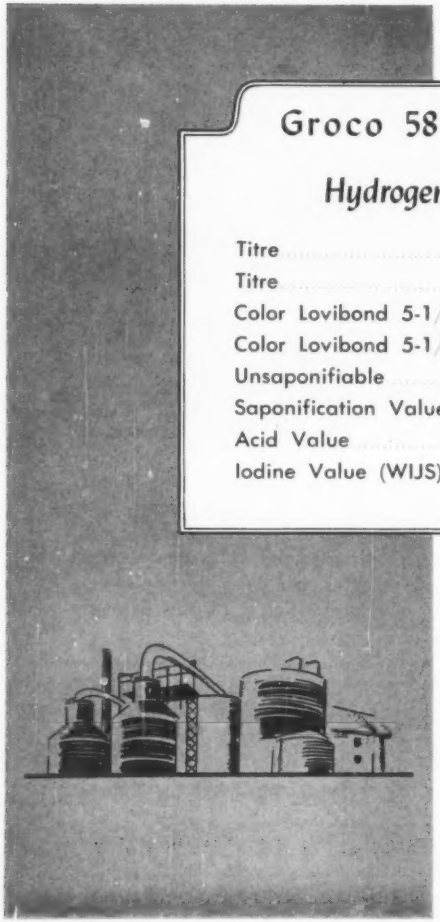

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Unsaponifiable	0.25% — 0.75%
Saponification Value	202 — 204
Acid Value	201 — 203
Iodine Value (WIJS)	3 max. —

A. GROSS & COMPANY

295 Madison Avenue New York 17, N. Y.

FACTORY: NEWARK, N. J.

Manufacturers since 1837

*Distributors in Principal Cities

The Technical Committee

Chairman T. G. Roehner, Director of the Technical Service Department, Socony-Vacuum Laboratories

As described at the annual meeting, the Panel on Delivery Characteristics of Dispensing Equipment for Lubricating Greases is working on several methods of correlating equipment performance with properties of lubricating greases. The methods fall into two main classes, one of which attempts to relate flow to grease viscosity, the other of which provides for an estimate of the lowest practical operating temperature for a product of given properties.

For this work the panel requires data by the approved test method (published in the May 1951 Spokesman) on a variety of products. It has completed the work on calcium and is now engaged in tests on lithium and soda greases. Any additional tests that other Technical Committee members can furnish would greatly improve any correlation the panel can develop. With the hope that such data will be forthcoming, the various panel deadlines are given:

Completion of Test Runs	April 1, 1952
Correlation of data and Panel Meeting	May 1, 1952
Final Report by Subpanel	September 1, 1952

In previous columns mention was made of the decision at the Annual Meeting in Chicago to organize subcommittees to study the following three subjects:

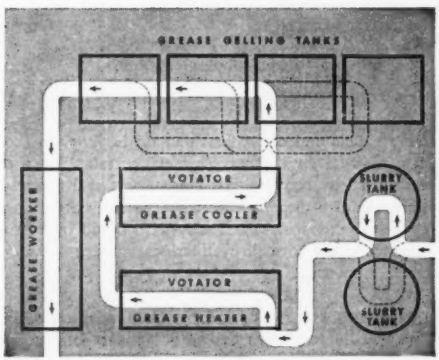
1. Recommended Practices for Packing Automotive Wheel Bearings
2. Preparation of Movie on Lubricating Greases
3. Manual of Test Methods and Definitions of Terms Peculiar to the Lubricating Grease Industry

The three subcommittees have not yet been established because nominations of the members for the N L G I Technical Committee are still in progress. As soon as the new list of members becomes available, a survey will be conducted to determine who would be interested in working on these study projects.

LUBRICATE FOR SAFETY
EVERY 1000 MILES

how to process grease
in 3 minutes

Votator
GREASE MAKING APPARATUS



VOTATOR Grease-making Apparatus cooks and cools ingredients for grease on a 3-minute time cycle. And *one man* can supervise the job.

That's because VOTATOR Grease-making Apparatus processes continuously—always under precise, automatic control. Time-consuming, labor-taking batch methods can be eliminated. Moisture content can be controlled accurately; grease delivered for packaging at the proper temperature.

VOTATOR Grease-making Apparatus can be applied for processing of many types of greases. Write now for case history facts. The Girdler Corporation, Votator Division, Louisville 1, Kentucky.

VOTATOR—T. M. Reg. U. S. Pat. Off.

the GIRDLER Corporation
VOTATOR DIVISION

Patents and Developments

NON-BLEEDING GREASES

Soap-thickened greases having a modified gel structure in which oil separation does not take place, are described in the Gulf Oil Corporation U. S. patent 2,578,851. Such lubricants are claimed to be particularly suitable for high pressure bearings.

The bleeding is retarded by incorporating 0.1-5 per cent of a metal phthalyl alkyl amide in which the alkyl group contains 8-20 carbon atoms. The metal portion may be sodium, calcium, aluminum, potassium, barium, strontium, magnesium, chromium, nickel, cobalt, zinc, lead, tin, copper cadmium, bismuth, etc. Examples of compounds which may be employed are the calcium or aluminum salts of N-dodecylphthalamidic acid, sodium salt of N-hexadecylphthalamidic acid, etc.

These salts may be produced in situ in mineral oil from phthalic anhydride, dodecylamine and aluminum hydroxide, or corresponding similar reagents. Tests made on such modified greases indicate that, whereas an ordinary grease will show 5-28 per cent oil separation after 50 hours at 212° F. in the A-N Aeron. Spec. AN-G-3a test, the modified greases containing the aforesaid salts show a zero separation.

SMOOTH-TEXTURED LITHIUM-BASE GREASES

Greases prepared from viscous mineral oils, such as those with viscosities above 750 SUS at 100° F., and a lithium higher fatty acid soap, in conjunction with a lithium organic acid salt of acids such as acetic, are claimed to be unsatisfactory in that they possess a grainy texture. According to U. S. patent 2,580,570 issued to Gulf Research and Development Corporation, smooth textured greases can be prepared with the aforesaid ingredients by the addition of a soap of partially hydrogenated rosin.

The discovery is claimed to be surprising, particularly in view of the fact that the addition of a small amount of a hydrogenated rosin to such a lithium base grease is detrimental to the penetration characteristics. That a hydrogenated rosin will improve the consistency of such a grease by decreasing its penetration characteristics is further believed to be surprising in that the addition of natural unhydrogenated rosin actually softens the grease or increases the worked penetration characteristics.

It is necessary to employ a rosin hydrogenated to at least 40 per cent of saturation. A preferred material is a rosin hydrogenated to about 60 per cent of capacity and having a melting point of about 168° F. About 0.2-1.5 per cent is employed, based on the weight of the grease, the higher amounts being used when making greases from oils having viscosities of 3000-4000 SUS at 100° F. Improved penetration characteristics are obtained when the weight ratio of the hydrogenated rosin to the lithium soap is between 1:4 and 1:30. A small amount of a diaryl amine oxidation inhibitor is advantageously added.

A typical grease and inspection are given as follows:

COMPOSITION, PER CENT BY WEIGHT:

Mineral oil	91.6
Lithium soap of the hydrogenated fish oil fatty acids	7.3
Hydrogenated rosin	1.1

INSPECTION DATA

CONSISTENCY (ASTM D217-47T):

Unworked	256
Worked	280
Dropping Point, °F. (ASTM D566-42)	364

Water resistance - rotating rack, water sprayed on panels at rate of 500 cc./minute for 15 minutes:

Per cent grease retention at 80° F.	90
Per cent grease retention at 100° F.	85
Percent grease retention at 120° F.	64

Metal adhesion:

Per cent grease retention at 80° F.	100
Per cent grease retention at 100° F.	100
Per cent grease retention at 120° F.	100
Oil separation, per cent	0.7

Wheel bearing test data - U. S. Army spec. AXS-1574, 220° F. - 450 R.P.M. - 6 hrs:

Flow of grease from hub	None
Grease on spindle	None
Leakage	None
Structure or consistency change	Not Apparent
Deposits on bearings	None

VOLATILE SOLVENT-DISPERSED GREASE

A more simple and convenient method for applying soap-oil grease to relatively inaccessible metal surfaces which cannot be serviced by conventional grease guns and fittings involves the use of a dispersion in a volatile solvent of an all-purpose grease composed essentially of a liquid oil retained in a mesh structure formed by interlocking fibers of a soap such as lithium soap.

Standard Oil Company of Indiana U. S. patent 2,580,654 points to the discovery that the oil component of a soap-oil grease may be extracted from the fibrous mesh of interlaced soap fibers by the use of solvents which will dissolve or reduce the viscosity of the oil component without altering the structural soap component. This discovery was disclosed

in THE INSTITUTE SPOKESMAN, April 1950, page 10. If an original soap-oil grease mass of a given configuration is held quiescent during such an extraction of the liquid component, such mass will not be subsequently altered in overall configuration. However, if the vessel containing the oil solution and residual soap structure is mildly agitated by stirring or shaking, there is an apparent breakdown of the structure into clusters of fibers which become dispersed throughout the solution. The striking feature is that when the solvent evaporates, these clusters apparently reunite with each other and imbibe the oil to give a reformed grease having about the same original characteristics. Even if the solution containing the dispersed soap fiber clusters is sprayed onto a metal surface through an atomizer, the action apparently does not destroy the clusters since, on evaporation of the solvent, a thin layer of grease is left having the same original properties.

The leaching is done with a volatile solvent which is at least 3-4 times, and may be 50 times that of the original grease. During the leaching, the solution is stirred or agitated to disperse the minute clusters. The solvent preferably is a non-flammable liquid or liquefied gas. The lithium soap is preferably to the oleate or palmitate, employed in the range of 4-20 per cent (say 10 per cent) in the grease. The preferred oil component is one having a viscosity SUS at 100° F. of 100-700 seconds (say 350 seconds). Among the solvents which may be employed are butane, pentane, hexane, naphtha fractions, halogenated hydrocarbons, Freons, and mixtures thereof. Such a grease may be dispensed by an aerosal bomb, and the claims of the patent are so limited.

EXTREME PRESSURE LUBRICATING GREASES

In this column, we have already discussed U. S. patent 2,516,137 dealing with metal soap greases containing reaction products of heterocyclic aldehydes and strong bases according to the Cannizzaro reaction. The base molecule of aldehyde is oxidized to the acid while a second molecule is reduced to the alcohol. The base used, of course, reacts promptly with the acid produced to form the salt, but the alcohol is not reacted.

In its U. S. patent 2,581,126 Standard Oil Development company reports the discovery of exceptional properties of the salts of sulfur-containing heterocyclic acids, such as those from thiophene compounds subjected to the Cannizzaro reaction. Thiophene aldehydes are preferred, and greases containing 3-15 per cent of the non-volatile Cannizzaro product possess desirable load-carrying properties.

Lithium hydroxide may be used for the soap base of the grease and is preferred because it makes a firm water-resistant grease. One specific example discloses the following procedure:

Cannizzaro ingredients:

Alpha thiophene aldehyde	10.00
Sodium hydroxide	3.18
Mineral oil, 55 S.S.U. viscosity at 210° F.	10.00
"Hydrofol Acids 54" (predominantly C_{18} substantially saturated fatty acids	15.00

Plymouth

ALUMINUM STEARATE 801-22

Still Preferred for:

- YIELD
- STABILITY
- VERSATILITY

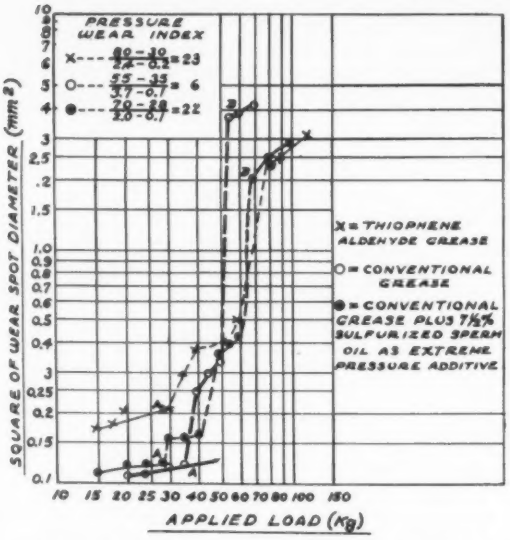
Also Some New

EXTREME HIGH GEL GRADES

M. W. PARSONS-PLYMOUTH, Inc.

59 Beekman Street — New York 38, N. Y.

Sodium hydroxide	1.00
Phenyl alpha naphthylamine	1.00
Mineral oil, as above	59.82


PRESSURE WEAR INDEX
X--- 40-10/2.4-0.2 = 23
O--- 55-35/3.7-0.1 = 6
●--- 20-18/2.0-0.7 = 22
X = THIOPHENE ALDEHYDE GREASE
O = CONVENTIONAL GREASE
● = CONVENTIONAL GREASE PLUS 7½% SULFURIZED SPERM OIL AS EXTREME PRESSURE ADDITIVE
SQUARE OF WEAR SPOT DIAMETER (mm²)
APPLIED LOAD (Kg)

The thiophene aldehyde and a portion of the mineral oil were charged to the grease kettle and stirring initiated. A 33⅓ per cent cold aqueous solution of sodium hydroxide (shown as part of the Cannizzaro reaction ingredients in the formulation) was then added. After completion of the Cannizzaro reaction, the "Hydrofol Acids 54'" were charged and neutralized with the balance of the sodium hydroxide (50 per cent aqueous solution). The balance of the mineral oil was added slowly while heating to 400° F. At this temperature the phenyl alpha naphthylamine was added as an oxidation inhibitor and the grease was cooled by pan cooling. It was further homogenized to a smooth uniform grease structure. The thiophene alcohol, as noted above, does not appear to form an azeotropic mixture with water. It appears to have little adverse effect on the structure of the grease and may be left in the grease in toto if desired. It would be somewhat difficult to remove this alcohol in any case.

Properties of the grease of the example are as follows:

Dropping ponit, °F.	500+
24-hour CU corrosion test at 210° F.	No Corrosion or staining of a polished copper strip

Norma-Hoffman bomb oxidation time (hours) to p.s.i. drop in pressure—

P. s. i.	Hours
5	60
10	475
15	1500

for a high VI ...Monsanto SANTODEX

Monsanto's increased production of Santodex, viscosity index improver, makes this additive available in quantity. Santodex enables you to use lighter viscosity stocks more effectively and to meet specifications requiring high viscosity indexes. With Santodex your oil helps engines start easier in cold weather and reduces oil consumption. Write for data and samples. MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

Santodex: Reg. U. S. Pat. Off.

SANTODEX

MONSANTO CHEMICALS – PLASTICS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

Extreme pressure or load carrying properties as measured by the Shell 4-ball test — Pressure wear index = 23

The alpha thiophene aldehyde grease showed extreme pressure properties, essentially equivalent to conventional extreme pressure greases as measured by pressure wear index tests.

As can be seen from the accompanying figure, the thiophene aldehyde grease shows reduced wear over the conventional grease to the same extent as a grease containing 7½ per cent sulfurized sperm oil.

HIGH TEMPERATURE GREASES

In the case of greases containing complex salt and soap thickeners, it has been found that salts of alpha keto aliphatic acids, in combination with conventional soaps, offer promise in giving greases suitable for high temperature lubrication use.

Among the acids preferred for the preparation of the salts is pyruvic acid, which is beta keto acetic acid. Other acids which may be used, are propionyl formic acid, butyryl formic acid, dimethyl pyroracemic acid, trimethyl pyroracemic acid, etc.

A suitable grease composition contained the following ingredients:

Pyruvic acid	4% by wt.
Hydrofol acids 54	8.5%
Oleic acid	8.5%
NaOH	5.4%
Phenyl alpha naphthylamine	1.0%
Mineral base lubricating oil 55 S.S.U. vis./210° F.	72.6%

The product obtained had a light brown color, smooth, short fiber, 428° F. dropping point, 210 mm/10 penetration consistency - unworked, and 240 mm/10 consistency after 60 strokes in standard 240 mm/10 grease worker.

The total soap content of the finished grease ordinarily will be 5-35 per cent by weight, 10-25 per cent being preferred. The preferred salt content is 3-7 per cent.

OTHER PATENTS

Brit. Pat. 666,992 (Standard Oil Development Co.)—Brick Grease composition.

Can. Patent 480,036 (Sundholm)—Grease gun.

Proven Lubricating Greases and Oils for all Industrial and Automotive Applications
SINCLAIR REFINING COMPANY
600 Fifth Avenue, New York 20, N. Y.
SINCLAIR OILS
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PEOPLE in the Industry

W. J. Fuchs Named Merchandising Manager Of Deep Rock Oil Corporation

W. J. Fuchs has been named merchandising manager of Deep Rock Oil Corporation, it was announced today by W. H. Garbade, president.

Although only an employee of Deep Rock since August, 1951, Mr. Fuchs was intimately associated with the development of the company's marketing program, The Deep Rock Plan, before joining the company. He served as an advertising and merchandising consultant to the company during the formative period of this program which was publicly announced in June 1949.

The Deep Rock Plan has placed all of the company's direct marketing operations in the hands of independent businessmen. Under it the company has helped create some 200 new independent businesses during the past two years. The company's independent jobber organization, now numbering upwards of 400, sells petroleum products throughout the Middle West.

The merchandising department which Fuchs will head embraces several functions. These include Jobber Operations, which is unique among oil companies. In this department a full-time jobber operations specialist provides close liaison between top management and the oil jobber. He assists the jobber in his operating problems and gives him a direct pipeline to management.

Mr. Fuchs is a native of Missouri and a graduate of the University of Missouri School of Journalism. Following his graduation in 1936, he was employed by a tire and rubber company and a year later became assistant advertising manager of a shoe company in St. Louis.

In 1938 he joined a St. Louis advertising agency in its New Orleans office and remained there until 1942 when the U. S. Army called him to duty in the field artillery. He was discharged in 1946 as a lieutenant colonel.

He then rejoined the advertising agency as vice-president and handled the Deep Rock account.

Morehouse Appoints Northern California Agent

GEORGE E. MISSBACH

Appointment of Pacific Coast Chemicals Company of San Francisco as exclusive northern California agents for Morehouse Industries, Los Angeles, has been announced by George E. Missbach, sales manager for Morehouse. Frank G. Collins will be in charge of sales and service for Pacific Coast Chemicals.

Pacific Coast Chemicals Company, organized by Harold M. Brez in 1949 to market chemicals to west coast industry and agriculture, will sell mills to the paint, food, ceramic, grease and pharmaceutical industries. Mr. Brez, a graduate of the University of Chicago where he majored in chemistry, has gained wide experience in the manufacture and formulation of paints and inks and in research in building materials. During the war, he served as a special investigator for the Bureau of Ships on paint and painting problems. He is a member of several chemical societies and is licensed by the state of California as a chemical engineer. The appointment to handle Morehouse equipment marks the initial step in an expansion program by Pacific Coast Chemicals to include the sales and servicing of production equipment.

Gordon H. Chambers Succeeds H. C. Meyer As Foote President

H. C. Meyer, newly appointed Chairman of the Board for Foote Mineral Company announces the election of Gordon H. Chambers as president.

Mr. Chambers, a graduate of the University of Pennsylvania joined Foote in 1928 as a Sales Engineer; was elected vice-president and treasurer in 1936 and has been executive vice-president since early in 1951.

Mr. Meyer, a recognized authority on the less common minerals and ores, will continue to take an active part in company affairs.

Lane-Wells Vice-President, Norman L. Dorn, Dies

Norman L. Dorn, vice-president of Lane-Wells Company, died at his home in Long Beach, March 2, 1952.

A native of Cleveland, Mr. Dorn spent most of his life in Nevada and California. He had been connected with the petroleum industry for more than thirty years. Before joining Lane-Wells in 1937, he was with Shell Oil Company for eighteen years in a progression of positions leading to his capacity of Superintendent of Production in the Southern Division at Long Beach.

In addition to serving Lane-Wells as vice-president, Mr. Dorn directed the company's engineering activities from 1937 until February of this year, when he relinquished his title of Chief Engineer to become vice-president and Consultant.

Mr. Dorn was active in most of the affairs of the industry and held memberships in the American Petroleum Institute, The American Institute of Mining and Metallurgical Engineers, the Nomads, and the Petroleum Production Pioneers. He was also a member of the California Club of Los Angeles, the University Club of Long Beach, and the Virginia Country Club.

A graduate of the University of Nevada, Mr. Dorn served overseas with the 38th Engineers in World War I.

Degree Of Fellow Awarded To Dr. Charles N. Kimball, Midwest Research Institute

Dr. Charles N. Kimball, president of Midwest Research Institute (Technical member of NLGI), Kansas City, has been named a Fellow of the Institute of Radio Engineers by the Board of Directors of that organization. He is the first practicing engineer from this section to be awarded such an honor by that international society, now celebrating its fortieth year.

The degree of Fellow is the highest membership grade in the Institute of Radio Engineers, and is given annually to those who have made outstanding contributions to radio and electronics engineering or allied fields.

The citation accompanying Dr. Kimball's award states that he is being recognized because of "his contributions and leadership in applying electronic techniques to a wide variety of industrial uses."

Presentation was made to Dr. Kimball and other leading radio engineers and scientists by the president of the Institute of Radio Engineers at the organization's annual national convention on March 5 in New York City.

Dr. Kimball came to Midwest Research Institute in 1950 from Bendix Aviation Corporation in Detroit, where he was Technical Director of the Bendix Research Laboratories. There he supervised a wide variety of experimental programs, including guided missiles studies, high altitude meteorological equipment, and nuclear instrumentation.

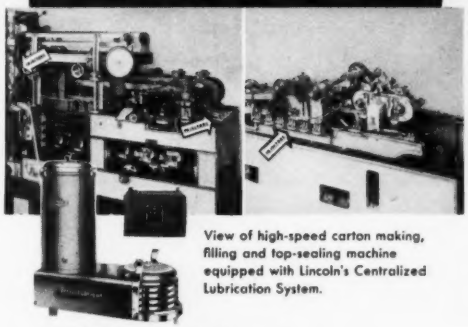
Following World War II, Dr. Kimball was one of the leading workers in the field of radio communications for railroads, and acted as a consultant for the Association of American Railroads.

He subsequently conducted original work in the application of electronics to the baking and milling fields with C. J. Patterson Company in Kansas City.

Dr. Kimball is also a member of Tau Beta Pi, the American Association of Cereal Chemists, the American Association for the Advancement of Science, and the Institute of Aeronautical Sciences.

"There Has Been No Lost Production Due to Improper Lubrication Since Installing *Lincoln's* CENTRALIZED LUBRICATION SYSTEM"

Mr. Frank Willbrandt
Chief Engineering Packaging Div.
Battle Creek Bread Wrapping Machine Co.
Battle Creek, Michigan



View of high-speed carton making, filling and top-sealing machine equipped with Lincoln's Centralized Lubrication System.

On Old or New Equipment, *Lincoln's* Centralized Lubrication Systems

APPLY THE RIGHT LUBRICANT IN THE RIGHT QUANTITY AT THE RIGHT TIME

"As a result of the use of Lincoln's Centralized Lubrication System on high-speed carton making, filling and top-sealing machines, there has been no lost production due to improper lubrication. Previously, similar machines, operating without the Centralized System, were frequently out of production, due to bearing failures caused by lack of lubricant.

"We find Lincoln's Centralized Lubrication System very reliable, as well as flexible, for varying operating conditions at different points on the machines."

Mr. Frank Willbrandt
Chief Engineering Packaging Div.
Battle Creek Bread Wrapping Mach. Co.
Battle Creek, Michigan

LINCOLN'S Lubrication System specialists will work with you and recommend the time and money-saving Centralized Lubrication System best suited to your equipment.

Write for your **FREE** copy of new catalog giving complete information on Lincoln's Centralized Lubricating Systems.

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LINCOLN
LUBRICATING EQUIPMENT • • •

LINCOLN ENGINEERING COMPANY
5702-30 Natural Bridge Ave., St. Louis 20, Mo.

Baroid Sales Division Announces Personnel Changes

Donald T. Fowler has been named Advertising Manager of Baroid Sales Division, National Lead Company, Houston. Experienced in the oil industry since 1940, Mr. Fowler has been associated with the Axelson Mfg. Co., Byron Jackson Co., and Lane-Wells Co.

L. W. Jones was recently promoted to the position of Export Manager at Baroid Sales Division, National Lead Company, Houston. Mr. Jones began his oil field experience with Reed Roller Bit Co. in 1934, working in major oil fields of Texas, Louisiana and Oklahoma.

James M. Bugbee, Jr., because of his field service experience, has been transferred to the advertising department of Baroid Sales Division, National Lead Company, Houston, to assist in the preparation of the firm's technical publications.

Producers of

LEAD NAPHTHENATE

MOONEY CHEMICALS, INC.

INDUSTRIAL CHEMICALS

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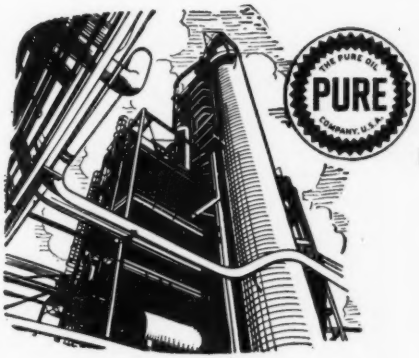
CLEVELAND 13, OHIO

An Important Announcement about Lubricating Costs



Be sure with Pure

The Pure Oil Company's great new lubricants' plant near Beaumont, Texas, is now in full production.

This makes Pure Oil's complete line of top-quality lubricants available to a far greater number of industrial users than it has been up to now.

Many of these lubricants—contrary to usual practice—are designed to do several *different* jobs instead of one specific job, and to do each job *equally well.*

This enables you to do *all* your lubricating with *fewer* lubricants. In other words, you can

SIMPLIFY AND SAVE . . . WITH PURE OIL INDUSTRIAL LUBRICANTS

If this sounds worth looking into (and we assure you that it is) write: The Pure Oil Company, Industrial Sales, 35 E. Wacker Dr., Chicago 1, Ill.

Industry NEWS

"Mr. Chek" Statuette Awards Presented To 51 Oil Company Lubrication Men

"Mr. Chek" statuettes, awards for service in the field of automotive lubrication, were presented to 51 oil company lubrication men serving on the Chek-Chart Advisory Board of Engineers. In explaining the gesture, Ray Shaw, Chek-Chart Corporation president, said, "We think there is no better way to thank the members of the Chek-Chart Advisory Board of Engineers and at the same time charge them with the responsibilities inherent in our common purpose —correct lubricants and service procedures to safeguard America's automotive vehicles." He explained that the "Mr. Chek" statuette is the only "Oscar" award of its kind in the field of automotive lubrication.

CORRECT LUBRICATION

SOCONY-VACUUM

GARGOYLE Lubricants

Backed by the World's Greatest Lubrication Knowledge and Engineering Service

SOCONY-VACUUM OIL CO., INC.
26 BROADWAY NEW YORK, N. Y.

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Phillips Petroleum Company, Marcus C. Low
Quaker State Oil Refining Corp., J. M. Koch
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"MR. CHEK" STATUETTE AWARD

Richfield Oil Corp. of N. Y., A. C. Sommers
Seaside Oil Company, W. F. Rhodehamel
Shell Oil Company, A. L. Wiest (Calif.), H. Hill (N. Y.), R. M. Cherryholmes N. Y.)
Shell Oil Co. of Canada, Ltd., L. T. Hill
Sinclair Refining Company, P. W. Zumbrook
Skelly Oil Company, C. E. Gore
Standard Oil Co., (Indiana), L. C. Kidd
Standard Oil Co., (New Jersey), G. H. Schoenbaum
Superline Oils, Limited, J. A. Noonan
Sun Oil Company, A. L. Clayden
Sun Oil Company, Limited, H. C. White
The Texas Company, F. E. Rosenstiehl
Tide Water Associated Oil Co., C. F. Becker (Calif.)
Union Oil Co. of California, F. H. Ott
Utah Oil Refining Company, E. M. Hubbard
Wolf's Head Oil Ref. Co., Inc., C. R. Scott

Enjay Company, Inc., Is Associate Member of NLGI

Enjay Company, Inc., is one of N L G I's newest associate members. In 1947 the company was organized to market a variety of petrochemicals including Paramins—additives created by Standard Oil Development Company, the research affiliate of Enjay Company, Inc., and one of the world's greatest petroleum research organizations.

During the past twenty years Standard Oil Development Company has pioneered and developed many types of additives. Paraflow, a boon to producers of engine oils, was introduced in 1931. This was followed in 1934 by Paratone, which the company claims to be the first viscosity index bearing corrosion inhibitor. Then in 1940 came a claim to the first all-purpose, heavy-duty detergent inhibitor.

From these "firsts" has grown the present family of Enjay Paramins, a line of products that carries the assurance of proved additives to make improved oils and fuels. In addition to petroleum additives, Enjay Company, Inc., is currently marketing chemicals from petroleum such as isobutylene polymers, alcohols, acetates, ethers, ketones and hydrocarbons.

Present officers of Enjay Company, Inc., are: President, John A. Britton, Jr.; Vice-President and General Sales Manager, James G. Park; Assistant General Sales Manager, A. Bruce Boehm.

Three Scholarships Will Go To Daughters of Employees Of Continental Can Company

Hans A. Eggerss, president of Continental Can Company, recently announced that three scholarships, to be awarded by the Carle C. Conway Scholarship Foundation in 1952, will be for the benefit of daughters of Continental employees. The Foundation, which is named for the former chairman of the board of Continental, who is now chairman of the executive committee and a director of the company, last year made its first awards to three sons of Continental employees.

Like those for 1951, the 1952 scholarships will be awarded on a competitive basis to eligible candidates meeting the scholastic and other standards set by the Foundation. Each of the awards will be for $1000 per year for a four-year term, subject to the holder continuing to maintain a satisfactory scholastic record in each year.

Trustees of the Foundation will select scholarship winners from applicants within each of the three geographical areas in the United States comprising Continental's regional divisions — Eastern, Central and Pacific. One award will be made in each region.

Any daughter of a Continental employee, or of a deceased or retired employee, is eligible to compete for the 1952 scholarship awards, provided she is a graduate of high school or preparatory school and will be entering college as a freshman.

The 1952 awards will apply to any accredited college or university selected by the successful candidates and approved by the Foundation. Selections will be based on the College Entrance Examination Board test results, the applicant's high school scholastic record, character, qualities of leadership, seriousness of purpose, financial need, and such other tests as the trustees may feel are appropriate for the purpose.

Dry Chemical Extinguishes Raging Fire in Seconds

A spectacular oil well fire that raged unchecked for five days in the Las Mercedes oil fields of Sociedad Anonima Petrolera Las Mercedes in Venezuela (an affiliate of the Texas Company) was extinguished recently by dry chemical extinguishers in exactly fifty seconds. It is believed to be the largest oil well fire yet extinguished by dry chemical.

Details of the extinguishment were received by the Ansul Chemical Company of Marinette, Wisconsin, whose equipment was used. It marked the second time in a little more than a year that Ansul's extinguishers put out a major oil well fire in Venezuela. In 1950, a five-hour fire in another company's oil field was put out in less than one minute, after all other methods of extinguishment failed.

Dry chemical is nothing more than specially treated sodium bicarbonate. It

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FOR OILS, GREASES, ETC.

No. 9 Niles Pail with lug cover and pour spout.

NILES STEEL PAILS

ordinarily are supplied with bail handles. Fabricated from black steel—outside painted or lithographed to order. Removable tops with lug covers, with or without pour spouts. Also in tight head style. 3½ to 6 gallon capacities.

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NILES STEEL DRUMS

55, 30 and 15 gallon capacities; and 100 lb. grease drums. Full open head or Bung type. Painted or fully decorated. Interior lacquered if desired.

100-lb. Niles Grease Drum with 14 inch full open top lug cover. Also made with 9 inch lug cover in center of head.

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REPUBLIC STEEL CORPORATION
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Atlas Life Building, Tulsa 2, Oklahoma

LUBRICATE
FOR SAFETY
EVERY
1000 MILES

differs from ordinary baking soda in that it is free-flowing and moisture-repellent, so that it can be expelled through an extinguisher without clogging up the outlets.

Dry chemical works much faster than any known agent in extinguishing fires of flammable liquids. Fire quickly breaks down the chemical particles, creating a blanket of carbon dioxide over the flame. With oxygen excluded, the fire is quickly snuffed out. Ansul engineers point out that the hotter the fire, the faster its extinguishment, because the chemical particles are broken down faster. This accounts for the speedy extinguishment of the Las Mercedes blaze.

Also of great help were the lessons learned in putting out the 1950 oil well blaze in Venezeula. At that time, the fire fighters tried to put out the fire with dry chemical, plus two streams of water. The effort failed, apparently because the water knocked a hole in the dry chemical blanket, thereby providing a source of oxygen for the fire. Later, the fire was put out by dry chemical alone. Thus, the fire fighters at Las Mercedes had a sound precedent when they diverted their water stream before going in with dry chemical.

Atlantic Refining Announces "Robot Brain" to Probe Secrets of Oil

The Atlantic Refining Company announced recently the development of a "robot brain" which will analyze petroleum products in one-tenth the time required by existing methods. This modern analytical tool will analyze a mere trace of gas or liquid, and in a matter of minutes record the complete chemical composition on a typed sheet of paper.

This was achieved by the linking together of an electronic counter and a mass spectrometer, one of the most important analytical instruments of the petroleum industry. The computer, dubbed the "Miniac", was developed for Atlantic by Physical Research Laboratories of Pasadena.

The "robot brain" was described today by Dr. W. S. Young of Atlantic's Philadelphia research staff, at the Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy held in the William Penn Hotel.

"The union of these two complex electronic instruments," said Dr. Young, "promises more than a ten-fold speed-up in obtaining vital information in the continual search for better quality gasolines and lubricants."

According to George Green of Physical Research Laboratories, designer of Miniac, this instrument can also be used separately on many other problems requiring high speed complex calculations. So applied, it can compute at the rate of 100,000 digits per second, or over 10,000 times as fast as the fastest human with pencil and paper.

An important link in the combination of Miniac with the mass spectrometer was a "selector" designed for Atlantic by Consolidated Engineering Corporation of Pasadena.

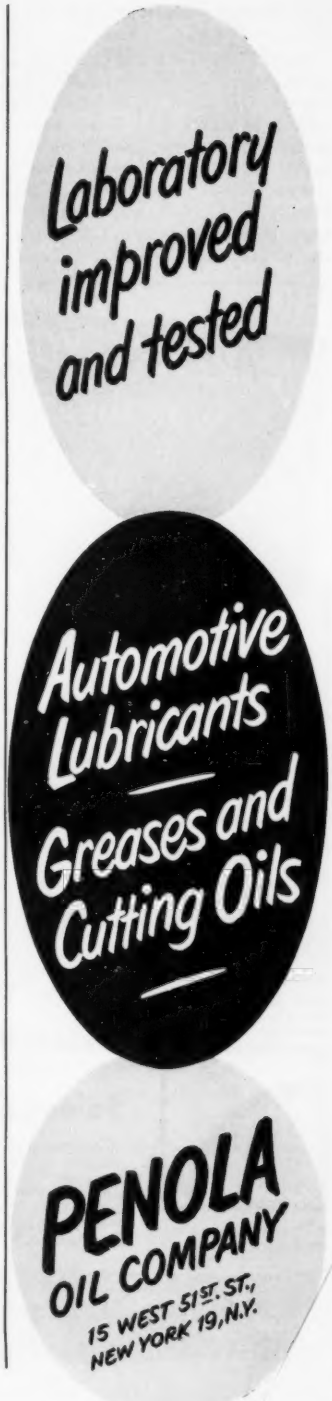
After almost two years of development, Miniac is nearly ready to be put in operation in Atlantic's Research Laboratories and will shortly undergo final tests. The company plans to make this important development available for industry-wide usage.

Three New Guns Brought Out By Alemite Division Of Stewart-Warner

Three completely new specialized guns, providing universal joint, water pump, steering gear and wheel bearing lubrication, and including a suction gun for use on wet clutches, shock absorbers or gear cases, have been announced by the Alemite division of Stewart-Warner Corporation.

All three guns are push-type. One is a medium pressure gun, equipped with hydraulic coupler, the second is a low pressure gun, while the third is a suction gun. They are:

Model 7510. This gun, with combination priming—spring prime for chassis lubricant, ram prime for heavy lubricant—easily develops up to 3000 pounds pressure. To provide greater utility, it has a small diameter hydraulic coupler, set at a convenient angle. Overall length is 23¼ inches and capacity is ten ounces of lubricant. The spring disengages for loading, so that there is no pressure to pull against and no possibility of the operator being sprayed with lubricant. This gun is for use with chassis lubricant, water pump lubricant,



wheel bearing lubricant or other lubricants.

Model 7517. This is a completely new steering gear gun with several unique features. One is the "Speedy-Fil design feature, exclusive with Alemite, which permits loading from any low pressure control valve. In addition, due to its two-way nozzle, it may be loaded through the nozzle by suction, from the original lubricant container. The nozzle also provides positive and instant shut-off when dispensing lubricant. Due to a floating follower, the handle does not protrude when the gun is filled. Capacity is 12 ounces and overall length is 24⅝ inches.

Model 7515-A. This suction gun is complete with 13¾ inch flexible tube nozzle having a special tip for inserting in ⅛ inch pipe thread holes. Capacity is 12 ounces and overall length is 31⅝ inches. A gooseneck nozzle, Model 6256, is available as an accessory. The gun is also available, less flexible tube nozzle, as Model 7515.

The three guns, according to Alemite sales executives, incorporate practical ideas received from thousands of lubrication equipment users. Consequently, they provide features and utility combinations not heretofore available. All have satin zinc finish and barrels have coarse diamond knurling for non-slip grip. Handles are full-sized for ease of operation. All models have ¼ inch p.t. female outlets. Name plates to show types of lubricants in use are available.

Information regarding location of Alemite distributors and jobbers is available from Alemite Division, Stewart-Warner Corporation, 1826 Diversey Parkway, Chicago 14, Illinois.

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FLEXIBLE SPOUT
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"What's A Silicone?" Is Dow Corning Booklet

Half a million times a year, more or less, Dow Corning Corporation men are asked the same question, "What's a silicone?" It is a seemingly simple question but for every time the question is

(*Continued on Page* 42)

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GREASES

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For INCREASED consistency and REDUCED grain

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For Metasap Metallic Soaps enable you to maintain high dropping points *plus* low penetration values. And their outstanding gel efficiency rewards you with greater yields.

Metasap Aluminum Stearates, in fact, are today's *foremost development* in grease making. They not only provide the perfect soap for any given oil, but permit you to vary the properties of your finished greases extensively through the use of soap mixtures.

Whatever your grease requirements, therefore, it will profit you to consult with us. With our specialized knowledge and wide experience, we can help you select soaps that will give outstanding results and show you the most advantageous methods of using them.

Metasap Aluminum Stearates include:

Metasap 537—designed to give No. 3 consistency and a short feather.

Metavis* 543—designed to produce any degree of stringiness desired.

Metasap 587—for producing soft, smooth and stable greases with low viscosity oils.

Metavis 540—for producing low viscosity greases for agricultural and industrial machinery.

Metasap Aluminum Stearate R, Aluminum Stearate GM, 537, 590, and 598—for producing harder greases, in the order given.

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● Sperm Oil is one of nature's best anti-rust materials. Possessing an unusually high film strength, it coats metal surfaces evenly and thoroughly. Furthermore, Sperm Oil tends to penetrate into the pores of metals, giving better protection and a longer protective life. Heat-treated parts that have been quenched in Sperm Oil, for example, can be stored for months without showing signs of rust. Stampings that have been Sperm Oil dipped or sprayed can also be stored for long periods.

Since Sperm Oil has a negligible free fatty acid content, it does not oxidize, harden, or form metallic soaps. As a result, "cementing" of stacked sheet or plate can be prevented by Sperm Oil coating.

If the oil you make is used for slushing, cutting, grinding, quenching, parting, penetrating or lubricating it will pay to investigate the high rust-inhibiting properties of Sperm Oil.

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Industry News

"Whats A Silicone?" . . .

(*Continued from Page* 40)

asked, a different and partly correct answer could be given.

Silicones are fluids and resins that keep clothes and shoes and brick walls dry in the rain. They are compounds that keep radar from going blind on a foggy night. They are fluids that polish without rubbing.

They are rubber that won't melt on hot aircraft engine cylinders or freeze on switches that operate bomb bay doors at 100 degrees below zero. They are electrical insulating resins and varnishes that double the power of electric motors or multiply by ten the life of electrical machines. They are . . .

And so it goes. You can describe an unknown quantity only in terms of what it does. That's what happened when Dow Corning Corporation undertook to write a 32-page booklet entitled, "What's a Silicone?" Readers will find it both pleasant and profitable.

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imparts good water resistance and insures excellent stability at both high and low temperatures. Has excellent noncorrosive properties. Well suited for synthetic greases.

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FUTURE MEETINGS of The Industry

APRIL, 1952

14-17 Petroleum Industry Electrical Assn. & Petroleum Electrical Supply Assn. (24th annual joint conference), Mayo Hotel, Tulsa, Okla.

16-18 National Petroleum Association (semi-annual meeting), Hotel Cleveland, Cleveland, Ohio.

21-23 American Petroleum Institute (Division of Transportation, products pipeline conference), The Blackstone, Fort Worth, Texas.

21-24 American Petroleum Institute (safety & fire protection committees), Hotel Texas, Fort Worth, Texas.

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Manufacturers of Lubricants

That will bear

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DISTINCTION

21-24 Socy. of Automotive Engineers (national aeronautic meeting and aircraft engineering display), Hotel Statler, New York, N. Y.

24-25 American Petroleum Institute (Division of Production, Rocky Mountain district), Gladstone Hotel, Casper, Wyo.

28-29 Independent Petroleum Assn. of America (midyear meeting), Deshler - Wallick Hotel, Columbus, Ohio

28-30 American Oil Chemists' Socy. (spring meeting), The Shamrock, Houston, Texas.

28 to May 3 Chamber of Commerce (annual meeting), Washington, D. C.

MAY, 1952

11-13 Empire State Petroleum Assn. (annual convention), The Roosevelt, New York, N. Y.

12-15 American Petroleum Institute (Division of Refining, 17th midyear meeting), St. Francis Hotel, San Francisco, Calif.

14-15 National Industrial Conference Board, Inc. (general session—all associates—36th annual meeting of board members), Waldorf-Astoria, New York, N. Y.

14-19 National Tank Truck Carriers, Inc. (4th midyear meeting), del Coronado Hotel, Coronado, Calif.

15-16 American Petroleum Institute (Division of Production, Pacific Coast district), The Biltmore Hotel, Los Angeles, Calif.

16 University of Kansas City (symposium on oil and gas), University of Kansas City, School of Law, Kansas City, Mo.

19-20 American Management Assn. (insurance), Hotel Statler, New York, N. Y.

19-20 American Petroleum Institute (Division of Marketing, midyear meeting), The Sheraton Plaza, Boston, Mass.

21-23 Oil Industry Information Committee, St. Francis Hotel, San Francisco, Calif.

27-28 American Petroleum Institute (Division of Marketing, Lubrication Committee), Mayo Hotel, Tulsa, Okla.

JUNE, 1952

1-6 Socy. of Automotive Engineers (summer meeting), Ambassador and Ritz-Carlton, Atlantic City, N. J.

5-6 Pennsylvania Grade Crude Oil Assn. (annual meeting), Hotel William Penn, Pittsburgh, Pa.

8-12 Canadian Gas Assn., Chateau Frontenac, Quebec City, Quebec, Canada.

9-10 Chemical Specialties Mfrs. Assn. (38th midyear meeting), Hotel Statler, Detroit, Mich.

9-13 National Fire Protection Assn. (annual meeting), Hotel Statler, New York, N. Y.

9-14 American Petroleum Institute (Division of Production, midyear standardization conference), Brown Palace Hotel, Denver, Colo.

19-20 American Management Assn. (general management), Waldorf-Astoria, New York, N. Y.

19-20 Kentucky Oil & Gas Assn., The Phoenix Hotel, Hotel Lafayette, Lexington, Ky.

22-25 Petroleum Equipment Suppliers Assn. (annual meeting), Mark Hopkins Hotel, San Francisco, Calif.

JUNE, 1952

22-27 American Socy. for Testing Materials (Com. D-2 on Petroleum Products and Lubricants), New York, N. Y.

23-27 American Socy. for Testing Materials (annual meeting), Hotel Statler, New York, N. Y.

23-27 American Inst. of Electrical Engineers (summer general meeting), Nicollet Hotel, Minneapolis, Minn.

AUGUST, 1952

11-13 Socy. of Automotive Engineers (national West Coast meeting), Fairmont Hotel, San Francisco, Calif.

19-22 American Inst. of Electrical Engineers (Pacific general meeting), Westward Ho, Phoenix, Ariz.

SEPTEMBER, 1952

8-12 Instrument Society of America (7th nat'l instrument conference & exhibit), Cleveland Auditorium, Cleveland, Ohio.

9-11 Oil Industry Information Committee, The Traymore, Atlantic City, N. J.

9-11 Socy. of Automotive Engineers (national tractor meeting), Hotel Schroeder, Milwaukee, Wisc.

10 American Petroleum Institute (Division of Marketing, Lubrication Committee), The Traymore, Atlantic City, N. J.

10-12 National Petroleum Assn. (50th annual meeting), The Traymore, Atlantic City, N. J.

14-19 American Chemical Society (122nd nat'l meeting) (Petroleum Division), The Traymore, Atlantic City, N. J.

22-24 American Trade Assn. Executives (annual meeting), Royal York Hotel, Toronto, Ontario

23-24 American Petroleum Institute (Executive Committee of the Board of Directors), Greenbrier, White Sulphur Springs, W. Va.

25-27 Independent Oil Compounders Association (5th annual meeting), Edgewater Beach Hotel, Chicago, Ill.

OCTOBER, 1952

1-4 (tentative) Socy. of Automotive Engineers (national aeronautic meeting and aircraft engineering display), New Hotel Statler, Los Angeles, Calif.

5-8 Controllers Inst. of America, Hotel Statler, Detroit, Mich.

27-29 National Lubricating Grease Institute (20th annual meeting), Edgewater Beach Hotel, Chicago, Ill.

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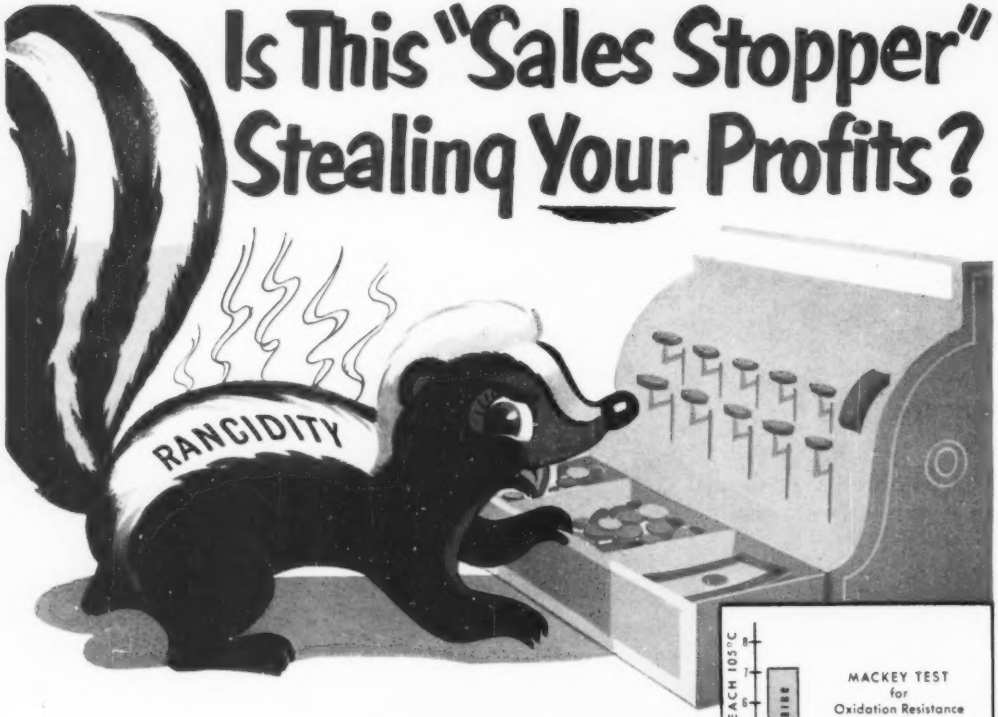

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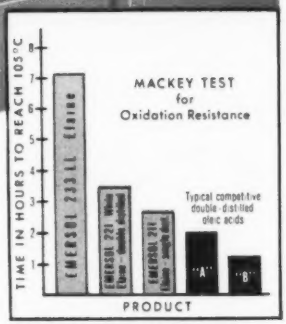

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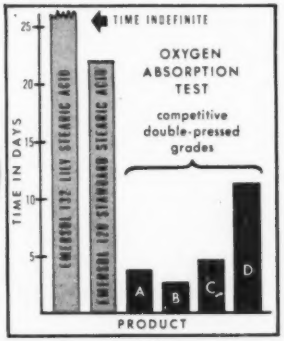

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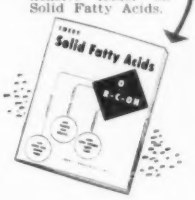

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Representative—Jerry Lyons

National Steel Container Corporation
6700 South LeClaire Avenue
Chicago 38, Illinois
Representative—Henry Rudy

Ohio Corrugating Co.
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Warren, Ohio
Representative—L. F. McKay

Rheem Manufacturing Company
570 Lexington Avenue
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Representative—G. Wesley Gates

Rieke Metal Products Corporation
Auburn, Indiana
Representative—Ralph S. Pearson

United States Steel Products Co.
30 Rockefeller Plaza
New York City 20, New York
Representative—Wm. I. Hanrahan

Vulcan Stamping & Manufacturing Co.
3000 Madison Street
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Representative—R. W. Morrison

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Disney near Marburg
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Representative—R. P. Field

Gray Company, Inc.
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Minneapolis 13, Minnesota
Representative—L. L. Gray

Lincoln Engineering Company
5701 Natural Bridge Avenue
St. Louis 20, Missouri
Representative—G. A. Hubbard

Stewart-Warner Corp.
1826-1852 Diversey Parkway
Chicago, Illinois
Representative—Walter Duncan

U. S. Air Compressor Company
5300 Harvard
Cleveland, Ohio
Representative—C. A. Benning

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Buffalo 15, New York
Representative—Edward V. Hegg

Chemicolloid Laboratories, Inc.
30 Church Street
New York, New York
Representative—David F. O'Keefe

The Girdler Corporation
Louisville 1, Kentucky
Representative—John E. Slaughter, Jr.

Morehouse Industries
707 Henry Grady Bldg.
Atlanta 3, Georgia
Representative—George E. Missbach

Stratford Engineering Corporation
1414 Dierks Building
Kansas City, Missouri
Representative—J. W. Sylvester

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St. Paul 1, Minnesota
Representative—H. F. Wagner

Freedom Valvoline Oil Co.
Box G
Freedom, Pennsylvania
Representative—D. A. Smith

Mid-Continent Petroleum Corporation
Tulsa, Oklahoma
Representative—T. E. Fitzgerald

TECHNICAL AND RESEARCH ORGANIZATIONS

Midwest Research Institute
4049 Pennsylvania
Kansas City 2, Missouri
Representative—Dr. M. H. Thornton

Petroleum Educational Institute
9020 Melrose Avenue
Los Angeles 46, California
Representative—G. A. Zamboni

Phoenix Chemical Laboratory, Inc.
3953 W. Shakespeare Avenue
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